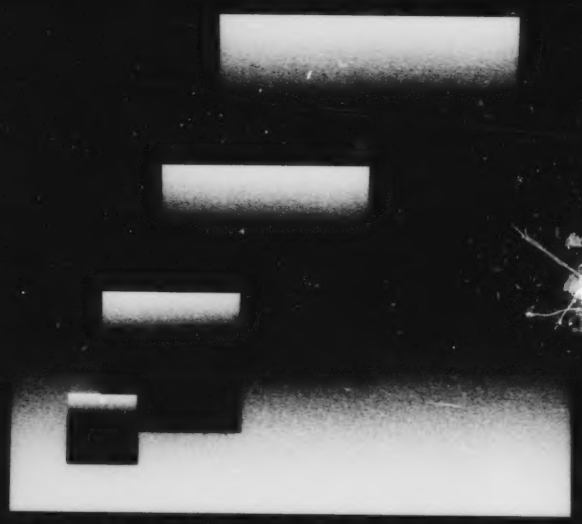

Structural Change and the Adjustment Process

Perspectives on Firm Growth and Worker Turnover

John R. Baldwin
Paul K. Gorecki

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Foreword

This study was jointly carried out by the Economic Council and Statistics Canada. It was initiated as background research to the Council's recent project on manufacturing firm adjustment, which led to the release, in July 1988, of a research report entitled *Adjustment Policies for Trade-Sensitive Industries*. The overall aim of the manufacturing adjustment project was to improve our knowledge of how firms, individuals, and governments react, both individually and together, to changes in international competition. This particular study discusses the characteristics of change that is ongoing in the manufacturing sector as a whole, while others conducted for the adjustment project examined the experience of adjustment in certain trade-sensitive industries (including shipbuilding, textiles, clothing, and footwear).

The study advances our understanding of the extent, nature, and patterns of adjustment in the Canadian labour market, particularly in the manufacturing sector. For the first time, the number of jobs gained and lost due to the changing fortunes of producers is linked to the causes of worker separation – that is, layoffs and voluntary separations due to quits, return to school, and other causes. As a result, we now have complementary sets of data on the rates of job turnover and worker turnover.

This has been possible because of Statistics Canada's belief that conducting quantitative analysis of the adjustment process in Canada is important. The Bureau has a commitment to the development and analysis of data sources that are capable of providing new insights into labour and firm adjustment.

The volume of such adjustment is impressive. At least 30 per cent of the jobs that existed in 1971 had disappeared by 1981 because of plant decline and closure, while the percentage of jobs gained as a result of plant expansion and opening was substantially higher. In addition, worker turnover caused by factors other than layoffs contributes a substantial extra dimension to the ongoing adjustment in manufacturing. At the very least, this evidence suggests that the view of a world that is relatively static and of a market system that has little adaptive ability should be discarded.

The continuing cooperation between the Economic Council and Statistics Canada has allowed this project to be conducted. Considerable resources were devoted to the development of longitudinal information that facilitates the tracking of individual firms and workers through time, necessitating the difficult task of linking and reconciling several databases. This study begins the process of bringing those two – the firm and the worker – sides together.

The authors of this study, John Baldwin and Paul Gorecki, have written extensively in the fields of industrial organization and firm adjustment to trade liberalization. Professor Baldwin, a member of the Department of Economics, Queen's University, is currently on a Visiting Fellowship at Statistics Canada. Paul Gorecki is a senior economist at the Economic Council and project leader of the Council's study of manufacturing firm adjustment. He is currently on secondment to Statistics Canada.

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Chief Statistician
Statistics Canada

Judith Maxwell
Chairman
Economic Council of Canada

READER'S NOTE

The reader should note that various conventional symbols similar to those used by Statistics Canada have been used in the tables:

..	figures not available
...	figures not appropriate or not applicable
– –	amount too small to be expressed
–	nil or zero.

Details may not add up to totals because of rounding.

Prologue

In many areas of public policy, knowledge of the amount of change or its effect on individual components of a population is a vital input into the definition and resolution of problems. These areas include mergers, regional development, competition, adjustment, poverty, and unemployment policy. Quantifying change to address concerns in these areas requires the use of data derived from the tracking of individual economic units (firms or establishments) and social units (persons, families, or households) through time. Such longitudinal data allow both the amount and the type of change to be catalogued. Repeated cross-sectional data, which make no attempt to link the same units over time, can only measure change for the group, not the individual unit.

The usefulness of longitudinal data has been increasingly recognized in a number of areas. Individuals can be followed over time to examine the events that trigger unemployment and poverty. Longitudinal data have enabled the social scientist to ask whether there is a large core of permanently unemployed or a group that is mired in poverty or whether there is a dynamic process at work that takes some people into and out of this condition. Similarly, tracking the income profile of individuals over time is useful for those who want to know the extent to which a progressive tax system remains so when the lifetime earnings history of individuals is taken into account.

While panel surveys that follow workers or families over time have been conducted for many years, especially in the United States, there are only a small number of data sources that enable members of the population of firms and establishments to be tracked over time. As a result, there have been few basic studies of the lifetime history of populations of firms. This has meant there is a dearth of information on the magnitude of change that occurs in the firm population – the extent of growth and decline in the incumbent population, the amount of entry and exit, and so on. For example, there is little information on whether large firms continue to dominate an industry for long periods of time, or how long it takes the dominant firm in an industry to lose that position.

Two consequences flow from this lack of information. First, opinions as to the nature of change will often be based on casual and often incorrect perceptions of the amount and nature of change. In general, information from repeated cross-sectional surveys underestimates the amount of change, and thus conveys a sense of stability that often does not exist. Second, policy in a number of areas will be made in a vacuum. For despite the lack of a basic understanding of the nature of change, the formulation of public policy will not await the collection of basic information on the nature of the competitive process. Unfortunately, without a thorough understanding of the nature of the dynamics of change in the business population, policy proposals will be based on casual empiricism and untested theories. Policies will be implemented for problems that are only poorly documented and that may not exist. This raises the possibility that expensive solutions to imagined problems will be developed, thus leaving the real problems unsolved.

Implications

In the social as in the physical sciences, research can be basic or applied. The research contained in this monograph falls into the former category, not because it is theoretical or abstract, but because it provides basic data on the amount of dynamism in the economy that, hitherto, have been unavailable. It is not directly aimed at one issue; rather, it provides fundamental background information relevant to policy making in a number of areas.

First and foremost, it provides a benchmark of the amount of change that a market economy generates as the ebb and flow of economic activity reallocate resources from one use to another. Information in this area is critical to policy makers who worry about the size of adjustments that are forecast to occur because of changes in tax or trade policy. For decades, policy advice from economists in those areas has relied exclusively on forecasts of adjustments that will result from policy changes without placing the adjustments in context. Little or no attempt was made to provide information on the nature and amount of ongoing change to which the economy adapts each year. Without this information, predictions of change could not be evaluated as large or small, except in a highly subjective sense.

The work in this monograph is a first step in providing such evidence. It examines the amount of resources that are reallocated from one firm to another on an annual basis. Over a decade, the cumulative effect of these changes is substantial. The evidence on the amount of change is critical in a number of ways. It forces issues that were once taken for granted to be completely re-evaluated. Much adjustment policy in the past was implicitly based on a static model of the economy. Changes leading to job loss were perceived as unusual – and therefore catastrophic, because they forced change in areas where it did not normally occur. The data contained herein challenge this approach. They force us to think of the economy in other than static terms and focus attention on the extent of dynamism in the economy. This new focus should not be interpreted to mean that adaptation is costless or easy for all those who are forced to take that course.

The data examined here force us to recognize that change is constantly taking place in the economy. This has numerous implications for adjustment policies. First, it requires those who would advocate special programs for persons who lose their jobs through the influence of some particular factor, such as trade-related adjustment, to recognize that many people lose their jobs for various reasons every year and that special programs require the isolation of the causes of job loss. That requirement, which may be impossible to implement, does place a greater onus on those who would advocate special programs targeted at specific groups to prove that they are feasible.

The monograph also provides basic data that overcome some of the misconceptions about the source of change in our society and, thereby, about some of the problems that are implicitly associated with change. Because longitudinal data at the firm level have not previously been available while industry-level data have been, most studies of labour reallocation have focused on interindustry shifts in employment. The monograph points out that most of the reallocation that occurs in jobs takes place between firms in the same industry.

Facts like these are very important in providing an understanding about basic market processes. For example, if most change is perceived to come from interindustry relocation, then any change found at the firm level will be perceived to come from interindustry shifts, and job loss will be regarded as controllable, in that industrywide policies for common firm-level problems, such as employment loss, can be managed. Even if not controllable, change may appear to be small enough to permit manageable compensation programs to be implemented. If most change comes from intra-industry shifts, the majority of job loss will be seen to be related to competitive forces that govern the rise and decline of firms – forces that cannot be controlled without irreparable damage to the market system.

The information in this monograph greatly extends our knowledge about the amount of adjustment that takes place in the economy. The basic picture that emerges is one of considerable and complex change occurring in labour markets over time. The economy clearly shows a considerable ability to adapt. As with basic contributions to knowledge, as many new questions are raised as new ones are answered. But it is better to know how to pose the right question than to worry about the answer to the wrong one.

Outline

This study is aimed at estimating the pattern and magnitude of worker and job reallocation, in both the long and the short run, as part of the dynamics of the market economy. Among other things, it addresses such questions as: Have there been shifts in the relative importance of different sectors and industries? What effects do the exit and entry rates of plants have on the release and hiring of labour? How extensive is the employment expansion and contraction of continuing firms? How important is firm size in the process of job gain and job loss? How significant are worker separations? What is the relationship between firm-related job turnover and worker separations? Do "trade-sensitive" industries experience less or more employment change than other industries?

Much of the study focuses on the manufacturing sector, drawing on Statistics Canada's annual establishment-based Census of Manufactures for the 1970s. A second data source, also drawn from Statistics Canada, is the firm-based Longitudinal Employment Analysis Program (LEAP) file, which tracks firms from 1978 to 1986. A third is the 1974-to-1986 longitudinal worker file, which was developed using the Record of Employment (ROE) data from Employment and Immigration Canada. These longitudinal files have been developed by the Business and Labour Market Analysis group at Statistics Canada.

In Chapter 1, a distinction is drawn between the growth and decline of job slots associated with employers' demand for labour, on the one hand, and job separations caused by the workers separating from their employers as a result of quits, pregnancy, and other causes, on the other hand. Chapters 1 to 5 and 8 to 10 deal primarily with variation in job slots; Chapters 6 and 7, with the fate of employees. Depending on the database, the study focuses on employment within establishments (i.e., plants) or firms (which may encompass one or several establishments under common control), and looks at the expansion or contraction of existing establishments (firms), the entry of new ones, or the exit of those closed down or merged. The data on job slots refer both to annual and to longer-run employment change in individual plants or firms, not to within-year job changes.

Interindustry Employment Shifts

Chapter 2 introduces the concept of the dissimilarity index, which is normally used to measure the relative change in output in respective industries between specific points of time. The index is applied to shifts in the shares of industry employment in census years 1951, 1961, 1971, and 1981. During this 30-year period, the work force in manufacturing and construction grew steadily, although not as rapidly as in services. The amount of structural change in employment – shifts out of one industry into another – slowed down over this period. Measured at the one-digit sectoral level, in any given year less than 1 per cent of total employment was being shifted permanently from one industry to another.

Attention then turns to the manufacturing sector. At a more disaggregated level, there is only slightly more variability than at the sectoral level. Over the period 1951-83, the share of manufacturing employment in textiles and in knitting mills and clothing trended down; in transportation and in printing and publishing, it trended up. Within each industry, year-to-year changes in employment often reverse themselves over the cycle. Again, it is found that, when similar points on the business cycle are compared, the amount of genuine inter-industry shift in manufacturing employment is less than 1 percentage point per year. Only in the severe recession of 1982 was there more dramatic movement. If a finer level of disaggregation is used and only declining industries are considered, the shift in industry employment is between 2 and 3 points per year. An analysis based on 23 categories of occupations also shows that occupational shift is less than 1 percentage point per year. There is more occupational variation within individual manufacturing industries, but there are indications that quite a bit of the intra-industry occupational movement cancels out when measured at the aggregative levels that are used.

The chapter concludes that the labour that is "re-allocated" annually (either from industry to industry or from occupation to occupation) rarely amounts to more than 2 percentage points and generally is below 1 percentage point. Much of the change that does occur from year to year is cyclical and is reversed within a very short time.

Firm-Related Job Turnover

Chapter 3 focuses on the importance of entry, exit, and the growth or decline of continuing firms for job turnover in manufacturing. This is then broken down to focus on change at the establishment level.

The results show that over the period 1970-79, the cumulative effects of entry and exit over the decade were large: new firms in manufacturing operating in 1979 that did not exist in 1970 accounted for 33 per cent of all firms and 29 per cent of employment. On the other hand, 43 per cent of the firms existing in 1970, accounting for 32 per cent of employment then, had disappeared by 1979. In terms of numbers of firms, entry and exit were dominated by new plant creation and plant closure. But in terms of employment, entry through plant creation and through merger were more equally split, as were exit via closure and via divestiture. This was because the new plants created by new firms were only about one third the size of the plants acquired by firms new to an industry.

In addition to being smaller, the new plants of new firms were generally more specialized than both the new and existing plants of continuing firms. Plants closed by exiting firms were smaller, less profitable, and less productive than continuing plants of continuing firms. Thus, "while birth via establishment creation by new firms may suffer a size disadvantage . . . those that survived until 1979 managed a profitability and productivity record at least equal to that of the continuing establishments of existing firms."

The Census of Manufactures is used to track the history of firms and their plants on a year-to-year basis over the period 1970-81. The proportion of manufacturing employment affected annually by entry and exit is less than 2 per cent. This compares with employment increases in growing establishments, which added 7.6 per cent, and with employment decreases in declining establishments, which lost some 6.5 per cent of all jobs in the manufacturing sector. Together, the total manufacturing job loss averaged 8.4 per cent annually over the period; the total manufacturing job gain, 9.2 per cent. Total job turnover – the sum of gross job gain and gross job loss – was over 17.5 per cent annually.

Although job gain and job loss are dominated by continuing firm expansion and contraction rather than entry and exit in the short run, that is not the case over the longer run.

Continuing firms do not expand *or* contract continuously, but rather experience periods of both decline *and* expansion. In contrast, the size of each entry cohort increases through time – the growth of the survivors more than offsets the loss from the cohort. Measured over a decade, job gain and loss from entry and exit are of much the same magnitude as the expansion and contraction of continuing firms.

The chapter also addresses the issue of the nature of the pattern of job creation and destruction across declining and growing industries. On this, the chapter concludes that: "If exit rates are relatively constant, and entry rates variable, then it is the birth process that essentially determines whether a region will have a growing economy. This suggests that industrial strategy should not try to prevent the inevitable death that will occur, but that it should encourage the birth process."

Chapter 4 addresses the following question: Are the job turnover rates observed in manufacturing replicated in other sectors of the economy? Here the LEAP file is used rather than the Census of Manufactures. The LEAP file is roughly comparable with the census information in that, while it is firm-based, it "reflects employment turnover at the establishment level in manufacturing."

Attention then moves from looking at the birth and death of firms to examining the job gains and losses annually by sector, using the LEAP file. The job turnover rates in the primary sector and construction are substantially above the all-industry levels. Gross job loss, for example, averaged annually 16.1 and 18.1 per cent for these two sectors, respectively; turnover rates in manufacturing are close to the average performance of 8.5 per cent for all industries. Again, most of the employment turnover on an annual basis occurs within continuing firms with an expanding or contracting work force; but over the longer run (1978-86), entry and exit become as important as the expansion and contraction of continuing firms in accounting for job gain and job loss.

Among industries, the transportation sector has the lowest rate of job turnover, while the primary sector and construction, as noted, have the highest. In all sectors of industrial activity, the annual job expansion rates are more volatile than the contraction rates. And even during the recession of the early 1980s, the proportion of job losses resulting from firm exits remained largely unchanged, with virtually all of the extra job losses showing up among continuing firms. The pattern of job growth and job loss seen in manufacturing is repeated in other sectors of the economy. "In the short run, continuing firm expansion and contraction provide almost all of the net employment change. In the longer run, the ratio of employment change due to births relative to gross job gain increases; so does employment change from deaths relative to gross job loss. . . . Manufacturing, however, shows neither the least nor the most job turnover."

Chapter 5 compares the job turnover experienced in Canada with that of other countries. The findings of studies of job losses and gains in other OECD countries seem to be quite similar to those found for Canada: a high percentage of job loss appears to be structural, in that it is the normal consequence of the decline and death of firms, and firm exit rates are relatively insensitive to changing economic conditions. Although the international evidence confirms that job change involves both cyclical and structural components, the factor distinguishing growing from declining or stagnant regions is the birth rate, not the death rate, of firms. A considerable proportion of short-run job change both in Canada and in other countries is transitory, in the sense that among continuing firms, job growth and job decline alternate from year to year, depending on the cycle.

Worker Separations

Chapter 6 shifts ground and focuses on what happens to workers. It draws on the Record of Employment (ROE) data originating with Canada's unemployment insurance system and distinguishes between displacements that are firm-initiated – temporary or permanent layoffs – and attritions, which are initiated by workers through quits, pregnancy, retirement, illness, and other causes. The chapter examines the separations data for the economy as a whole but, given the thrust of earlier chapters, gives special attention to the manufacturing sector.

Annual rates of job loss cited earlier are found to be equal to the permanent-layoff rate. Thus short-term fluctuation in the level of firm employment is associated with permanent reallocation of the labour force of equal importance. The ROE data are more comprehensive than the census data, because they capture job losses that may be reversed within the same year, while the census data do not; they amply confirm the earlier findings with respect to the churning of jobs as firms enter, grow, decline, and disappear.

The number of separations – from all sources, including individual attrition – is equal in magnitude to about one third of the work force each year. For the years 1974-83, the total annual average separation rate in manufacturing was equivalent to 64 per cent of the work force; about half of that was the result of attrition. There is considerable intersectoral variation in the separation rate, defined as the number of separations divided by a measure of employment. For example, the annual permanent-layoff rates between 1978 and 1981 were about 7 per cent in manufacturing, 40 per cent in construction, 30 per cent in the primary sector, and only 4 per cent in transportation. Furthermore, these data from unemployment records show that separations associated with permanent layoffs are typically at least as large as the job-loss rate calculated for declining and exiting establishments.

Workers permanently laid off from establishments must find alternative opportunities elsewhere. Chapter 7 looks at what happens to workers after they are separated from a job. Essentially, it examines the mobility of displaced workers between various industries, occupations, and regions. From these data, it appears that workers in Canada experience considerable interindustry, interfirm, and interoccupational change. A study that tracked individuals who received unemployment insurance benefits *twice* during the period 1978-82 found that, overall, about 70 per cent of these persons had changed employers. In manufacturing, the proportion was somewhat lower: 52 per cent had changed employers, whereas 48 per cent had returned to their original employer.

Indeed, manufacturing workers generally seem to be somewhat less occupationally mobile and to prefer work in manufacturing to work in other sectors. Drawing on data for workers permanently laid off who subsequently found full-time employment with another employer and distinguishing between manufacturing and commercial services sectors only, the proportion of laid-off workers in manufacturing taking a subsequent job in services was only 43 per cent.

The results of different studies done on patterns of worker adjustment, in the steel, clothing and textiles, footwear, auto, and other industries, where there was considerable adjustment and subsequent interindustry movement of laid-off workers, are discussed in some detail. While the results tend to be relatively particular to each case, they do show that, because of the combined influence of the seniority system, which determines who is to be laid off, and the smaller degree of commitment to a particular trade or locale displayed by younger workers, the latter exhibit more occupational, industrial, and geographic mobility than their older fellow workers. The latter have more employer- or occupation-specific skills and experience more difficulty finding alternative work; consequently, they are unemployed for longer periods of time. Clearly, workers in regions with a diversified industrial base have lower adjustment costs and less difficulty than workers in more remote areas who have to move further or to accept less desirable alternative employment.

Job and Worker Turnover by Firm-Size Class

Chapter 8 focuses on data from the Census of Manufactures, LEAP, and ROE, and considers whether job turnover and worker turnover vary with the size of the firm. The interest in differential job-creation and job-loss performance across size classes has its roots in the hypothesis that the average plant size – as measured by employment – is becoming smaller and that this is caused by either the growing obsolescence of large firms or the entry of small firms that are more technology- or capital-intensive. It is also the result of claims that small firms are the engine of growth because the majority of new jobs are being created in small firms.

The chapter points out that the fact that most of the net job gains occur in small firm-size classes is partly a statistical phenomenon. There is growth and decline in most size classes of about equal magnitude. In the smallest, decline is bounded by zero. Therefore, net job creation in small firm-size classes is generally positive, even where total employment is not growing because employment growth in small firms just replaces employment decline in declining large firms.

The chapter examines the implications of job loss through firm exit. As observed, since firms that exit through plant closure are much smaller than those that exit through merger, each category should be treated separately. Furthermore, since only the former results in an immediate loss of jobs, the distinction needs to be made, irrespective of their size. The importance of exit through divestiture of plants increases by size class; while that of exit through plant closure declines. Year after year, exit through plant closure occurs at a relatively constant rate; on the other hand, exit via merger has been quite variable over time. Moreover, an earlier study on mergers found that while a significant proportion of them went to acquiring firms in the same size class, the process contributed to the movement from smaller to larger firms. Thus, while employment in the largest firms is likely to decline over time, this tendency is cushioned by the merger process. As firms in the larger size class decline, some firms in the smaller classes move up to replace them. The overall appearance of the size distribution tends to remain relatively unchanged. This applies for all industries, as well as manufacturing.

The higher incidence of year-to-year job loss and job gain in small manufacturing firms should not mask the fact that the long-term employment losses and gains from declining and growing large firms account for a greater proportion of total job losses and gains. Between 1978 and 1986, firms with less than 20 employees accounted for 34 per cent of gross job loss; firms with 100 employees or more, for 42 per cent. The corresponding figures for gross job gain were 11 and 69 per cent, respectively. Growth and decline are pervasive across the size distribution of firms.

Large firms employ many more people than small firms. Thus, while workers in small firms have a high probability of losing their jobs because of a higher incidence of firm failure, in absolute numbers the job loss is highest among the larger continuing firms that are shedding jobs. There seems to be a ceiling to employment growth among the largest firms, and certainly it was this segment of manufacturing which, during the recession, accounted for much of the job loss in that sector.

Looking at the economy as a whole, many of the same factors are found to operate across all industries. Intra-industry structural change, it is argued, "leads to the birth of many small firms, the growth of some, the decline of large firms, and the eventual exit of those firms in permanent decline. New firms then supplant old ones. The identity of market participants and the relative size of firms change over time. During this process there are significant temporary fluctuations in employment that are reversed in the longer run. These too lead to worker turnover."

Job Turnover – Further Analysis

In Chapter 3, the pattern of job change was examined using firm growth and decline for all of the manufacturing sector. In Chapter 9, the analysis is taken a step further by disaggregating the manufacturing sector into individual industries. Annual rates of job gain and job loss, divided into entry, exit, and continuing-establishment growth and decline, are reported for 20 different manufacturing industries, ranging from food and beverages, clothing, metal fabricating, and transportation equipment to chemicals. These figures show that the relative employment gains and losses associated with entry and exit, as opposed to growth and decline in continuing firms, vary quite widely, depending upon the industry. For example, the annual mean of the ratio of entry to total job gain in the food and beverage industry over the decade 1970 81 was 14 per cent, compared with the petroleum and coal products industry, where it was 32 per cent. Similarly, the ratio of job losses from exiting establishments to total job loss ranged from 52 per cent in furniture to 9 per cent in the primary metals. The average for all of manufacturing was 31 per cent.

What the figures show is that most of the gains and losses in manufacturing are not the result of job loss being concentrated in some industries and gains in others; rather each manufacturing industry undergoes substantial intra-industry change. On this score, there is little to distinguish import-competing manufacturing industries from the rest; those with low import-penetration ratios showed roughly the same characteristics as those with high ratios of import competition. Indeed, among those regarded as trade-sensitive – leather, textiles, knitting mills and clothing – exit and decline rates are generally slightly higher than for other industries in manufacturing, but so too are the entry-plus-growth rates. Thus these trade-sensitive industries are marked by more, not less, intra-industry dynamism than the rest of manufacturing.

Conclusions

Chapter 10 draws the study to its conclusion and reviews the main findings. The data from the Census of Manufactures and the LEAP file show that in manufacturing the vast bulk of the reallocation of jobs occurs within industries. Within manufacturing, less than 1.5 percentage points of total employment shift annually from those industries which are losing their share of employment to those which are increasing their share; when the period of measurement chosen is the decade, the accumulated changes amount to less than 0.5 percentage points per year. In the decade 1971-81, some 19 per cent of 1971 employment disappeared as a result of plant exits; some 12 per cent, as a result of plant decline. On the other hand, during the same period, establishment entry added 19 per cent to 1971 employment in the manufacturing sector; growth in continuing establishments added another 21 per cent. These are large when compared with the degree of interindustry or intersectoral change.

Industries grow not so much through a reduction in exit rates as by an increase in entry rates. Exit is seen as part of a natural self-selection phenomenon, and the aggregate failure rates. Exit is seen as part of a natural self-selection phenomenon, and the aggregate failure rate of business over time is relatively constant. And while much of the expansion and decline of jobs occurs at the intra-industry level, the data from longitudinal unemployment insurance records show that workers in their search are not confined to a narrow range of employers. Many transfer to other industries and occupations in a way that suggests a very substantial amount of personal mobility. It is thus concluded that sensible public policy in the area of adjustment assistance "should facilitate, not hinder, this natural movement of workers who are being continually released." While adaptation is continuous and is relatively costless for some, for others there may be considerable loss of income or a substantial amount of capital put at risk. In the long run, though, failed firms are replaced by those with lower costs or better products; improved productivity performance enhances the real wages of workers; and consumers ultimately are better off.

1 Introduction

Change in the Canadian economy is pervasive. Resources are constantly being transferred from one use to another for a variety of reasons. During this process, firms decline or exit from an industry because of inept management, better returns in another industry, or because a new idea or new project did not meet expectations. Workers quit or are laid off because of a mismatch between skills supplied and those demanded. This turnover in firms and workers is endemic to the workings of a market economy. It provides the adjustment required for adaptation. Firm and worker turnover serve to reallocate resources from lower- to higher-value uses and thus make an important contribution to the growth of the Canadian economy.

Economic research studies abound on the changes that can be expected from a variety of government actions in the area of fiscal, tax, or trade policy; but they generally concentrate on only one aspect of the process. They predict the amount of change expected from an alteration in public policy without placing it in the broader context that is needed to appreciate the importance of the phenomenon being examined. For example, trade liberalization studies generally focus exclusively on predictions of the size of the effect of tariff and nontariff barrier reductions in particular industries, without providing a benchmark against which the effect of these predicted changes can be evaluated. It is now some 10 years since a leading trade economist pleaded for empirical work on the size of the adjustment that is ongoing in the economy, so that policy makers could evaluate how disruptive trade liberalization was likely to be (Johnson, 1978). Unfortunately, prior to now, little has been done in this area.

This study is meant to rectify this deficiency. It focuses on the amount of adjustment that the Canadian economy has managed to absorb in the recent past. Since 1966, one of many influences affecting the performance of different sectors of the Canadian economy has been the ongoing effect of trade liberalization under the Kennedy and Tokyo Rounds of tariff reductions. Even more dramatic than the decline in tariffs is the reorientation of trade that has occurred. Canada is referred to as having an open economy, but the degree of openness, at least in the manufacturing sector, has increased dramatically since 1966. Between 1966 and 1987, manufactured exports have increased from 19 to 36 per cent of shipments. Manufactured imports, over the same period, have increased from 21 to 37 per cent of the domestic market.

This study was stimulated initially by an interest in the ability of the Canadian economy to adapt to further trade liberalization. Measures of adjustment, then, are calculated for a period when the importance of trade has increased considerably. They provide a benchmark for what might be expected if trade liberalization continues. Trade, however, is only one of the factors contributing to change in the Canadian economy during the period studied herein.[1] The energy crisis, the slowdown in productivity growth, the depreciation of the Canadian dollar, the merger wave of the late 1970s, the recession of 1981-82, and the collapse of commodity prices have all had their effect. The amount of ongoing change that is reported herein comes from a variety of sources and, as background, is relevant to those contemplating changes in trade policy as well as many other policy initiatives.

The future will not necessarily be a replication of the past. The events that will determine future growth will depend only in part on trade liberalization. Predicting all such influences is a difficult, if not impossible, task. This raises the question as to whether predictions can be made of the amount of resource reallocation that may be expected without specific predictions as to the type and pattern of events that will cause this change.

The data developed herein suggest that this can be done. Despite the myriad of different influences that have affected the Canadian economy at different times in the past, the proportion of resources that is being continuously released for reallocation by the operation of the market system has been quite constant, and its cumulative effect over a decade is relatively large. It is the relative constancy of the rate at which resources have been released, despite different influences operating in different years, that allows the past to be used as a predictor for the future.

The Measurement of Change

Before proceeding, it is important to define how change is to be measured, since there are many ways of doing so. Discussions of the amount of change experienced by the Canadian economy often tend to focus on quite different concepts. At one end of the scale are studies that measure the extent to which some sectors have grown and others have declined. These intersectoral studies miss a considerable amount of reallocation that goes on within sectors. Within an industry, labour adjustment occurs as producers enter and exit, and as continuing producers grow and decline. Job-change studies capture this effect by measuring the size of the employment change associated with the growth and decline of producers. While job-change studies capture more aspects of change than intersectoral studies do, they still omit important aspects of the process by which resources are reallocated from one use to another. For example, firm employment can remain constant between two periods, even though some workers may leave the firm and others may be hired to replace them. Job-change studies will miss this aspect of change. This shortcoming is overcome by labour-turnover studies that focus directly on worker separations.

Each of these three approaches provides useful but different information on the sources of change. The studies that examine the size of intersectoral shifts in resources address the question of how the growth and decline of industries contribute to reallocation. Job-change studies allow an evaluation of the extent to which it is shifts in the demand for labour associated with fluctuating producer fortunes that lead to reallocation. Changes in producer fortunes occur both because of intersectoral shifts and intrasectoral changes in relative firm position arising from competition within an industry.

In contrast to the job-change studies that focus on positions available in producers, studies of labour turnover focus on workers. These studies measure the number of workers who separate or are hired by an employer. Separations are broadly divided into two groups. Changes in producer employment levels will result partly in forced worker separations (displacements) or layoffs. These are often referred to as involuntary separations. The second component of labour turnover (attritions) is made up of those workers who quit[2] their jobs to find superior employment opportunities, to retire, or to return to school. These are often referred to as voluntary separations. The sum of the forced separations (layoffs) and the voluntary separations (quits and other attritions) may be larger than changes in producer employment levels.

Because each approach yields different but valuable information on the process of change in the Canadian economy, all three are adopted here. In Chapter 2 of the study, the size of intersectoral shifts are examined. In Chapters 3 to 5, the amount of job change due to shifting producer fortunes is outlined. In Chapters 6 and 7, the extent of labour turnover that occurs because of worker separations is measured.

It is important to understand the relationship between these various concepts, in particular the difference between job turnover and labour turnover. Broadly speaking, the first is related to demand conditions for labour arising from the change in producer size; the second includes more detail on the supply response of the labour force. Figure 1-1 provides a schematic depiction of job turnover. Figure 1-2 gives a picture of labour turnover.

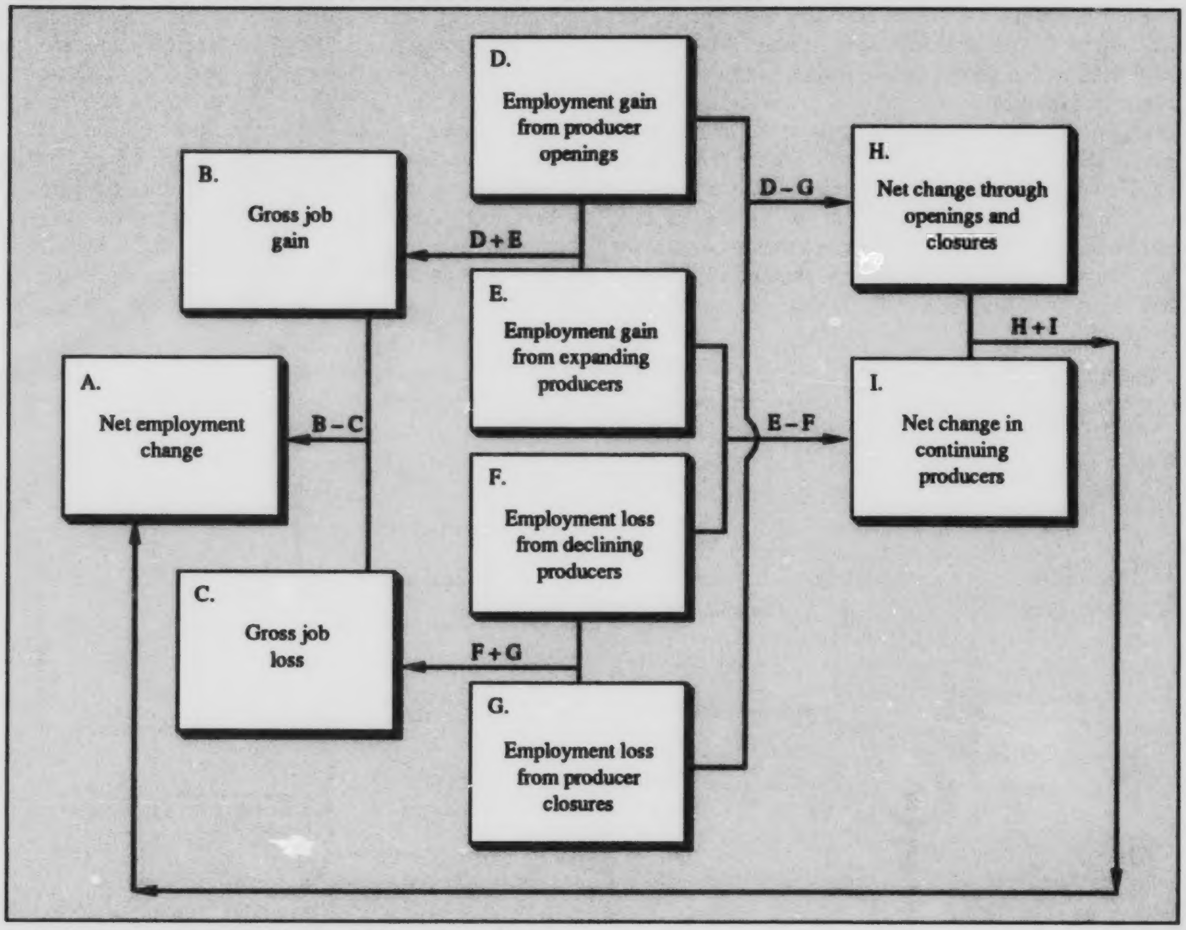
The process of job change is examined first. In Figure 1-1, net employment change (A) is the difference between gross job gain (B) and gross job loss (C). Gross job gain is the sum of employment gain from new producers (D) and from growth in continuing but expanding producers (E). Gross job loss consists of job loss due to closures (G) plus that due to the decline in continuing producers (F). The process can also be examined by dividing the net job change into that which comes from openings and closures ($H = D - G$) and the net change that comes from the continuing sector ($I = E - F$).

The complexities of worker turnover are outlined in Figure 1-2. Workers in a firm in year t (A) can be divided into those continuously employed (B), those laid off (C), and those who quit or separate for other reasons (D). Employment in the same firm in period $t+1$ (J) consists of those continuously employed (B), recalls from layoffs (F), returns from quits and other attritions (H), plus new hires (E). Those who are permanently laid off (G) or those who leave permanently for other reasons (I) make up the group that is reallocated as the result of both demand forces and labour force supply decisions (K). It is evident that employment levels in the two years can be the same, but reallocation may nevertheless be taking place (if $E > 0$ and $E = G + I$).

The two concepts of job change and labour turnover are related. Labour turnover consists of separations (S) from and accessions (A) to the firm during a period. As can be seen from Figure 1-2, separations consist of those laid off (C) and quits and other attritions (D). In turn, these separations can be divided into those who return to the same firm ($F + H$) and those who are not rehired by the same firm ($G + I$). Accessions consist of new hires (E) and rehires from layoffs (F) and from quits and other

Figure 1-1

A Schematic View of Job Turnover Due to Producer[1] Growth and Decline


D.
Employment gain from producer openings
B.
Gross job gain
D+E
H.
Net change through openings and closures
D−G
E.
Employment gain from expanding producers
H+I
A.
Net employment change
B−C
I.
Net change in continuing producers
E−F
F.
Employment loss from declining producers
C.
Gross job loss
F+G
G.
Employment loss from producer closures

[1] Producer in this context could be either the firm or the establishment.

SOURCE Based on OECD (1987), Chart 4.1, p. 98.

attritions (*H*). The difference between accessions and separations ($A - S = E - G - I$) is equal to the difference between employment in the firm at the beginning and end of the period.[3]

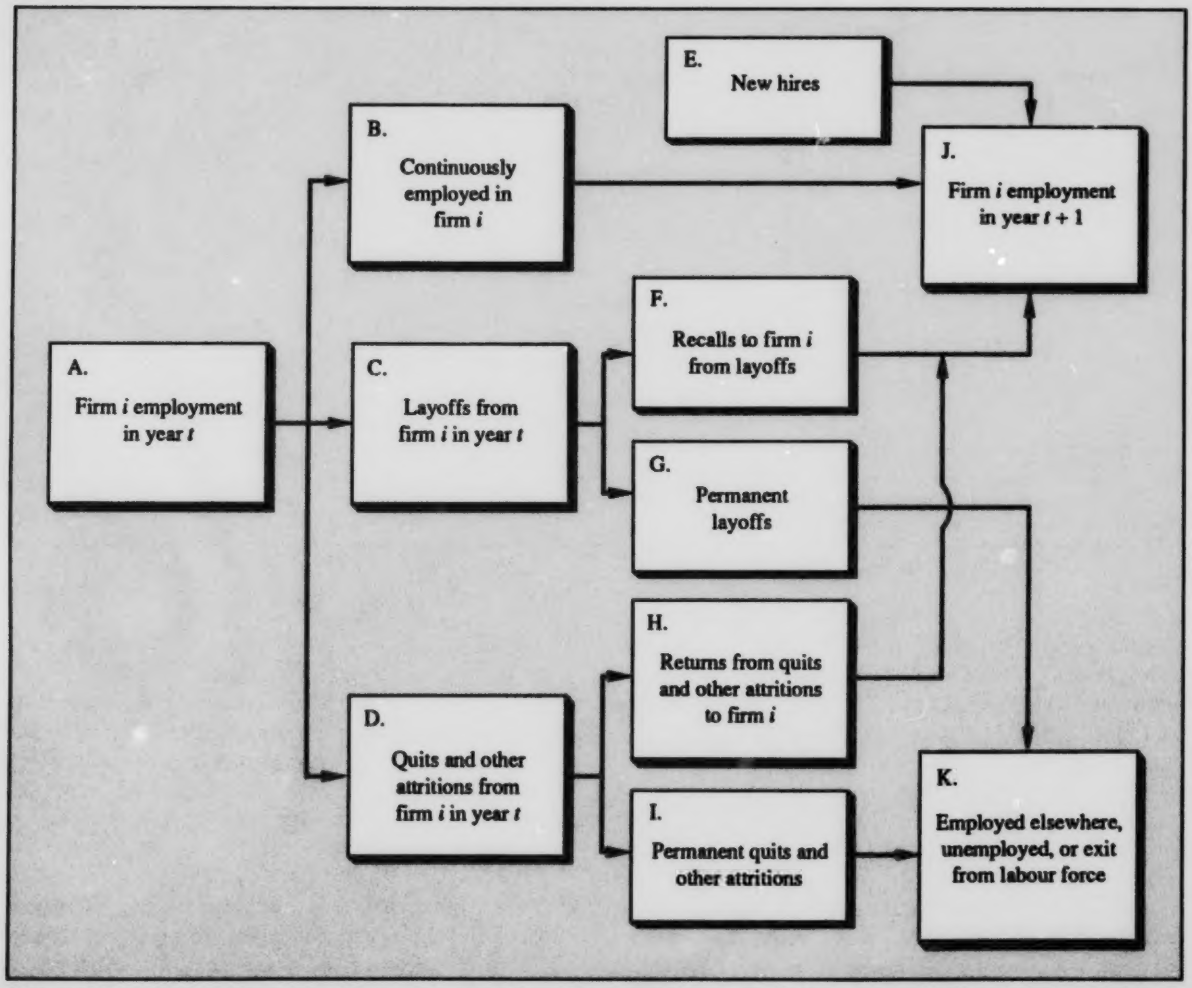
While the two concepts of job change and labour turnover are related, they measure quite different phenomena. Job-change studies measure the extent to which jobs or posts at the producer level have increased or decreased. Labour-turnover studies reveal how much worker turnover is associated with change in the number of posts available. Their relationship is analogous to the relationship between net change in employment and job turnover in Figure 1-1. While net employment change (*A*) is equal to gross job gain minus gross job loss ($B - C$), examination of net employment change alone hides a considerable amount of churning at the firm level. Similarly, examining the components of job change (job gain and job loss) by focusing on employment differences alone may hide considerable churning in the underlying labour force.

While these measures capture important dimensions of change, they cannot measure all aspects of change. Ultimately, measures of change are of interest only if they usefully describe the pressures that are placed upon the economy during the adaptation process. The measures adopted herein closely measure such aspects, but their imperfections should be clearly understood. On the one hand, measures of job change may overestimate the amount of forced reallocation of labour. An industry may decline and another grow without any forced displacement of existing workers – if retirements of workers handle decline, and new entrants to the labour force satisfy the demand for new workers. On the other hand, job-change measures may not catch some aspects of change. Job-change measures that use firm level employment will not catch worker movements within the firm from one establishment to another. Similarly, labour-turnover statistics will also fail to catch some change. Workers who move from one occupation to another within a firm without a separation spell will not be included in labour-turnover measures.

The measures of change used herein, thus, do not cover all aspects of change. No summary measure can hope to do so. The purpose of a summary statistic is to distill a large amount of data in a meaningful way. Each of the measures used here does that. Where certain shortcomings of the summary measure may be particularly worrisome, additional data are presented to complement the central analysis. For example, job change may have an unequal impact on different size classes of producers. A summary measure of overall change will

Figure 1-2

A Schematic View of Worker Turnover Due to Separations


E.
New hires
B.
Continuously employed in firm *i*
J.
Firm *i* employment in year *t* + 1
F.
Recalls to firm *i* from layoffs
A.
Firm *i* employment in year *t*
C.
Layoffs from firm *i* in year *t*
G.
Permanent layoffs
H.
Returns from quits and other attritions to firm *i*
D.
Quits and other attritions from firm *i* in year *t*
I.
Permanent quits and other attritions
K.
Employed elsewhere, unemployed, or exit from labour force

not show which group of employers is most unstable. Therefore, data on job change by producer size class are examined. In addition, data on the mobility of workers across occupations and employers are used to ask how much intrafirm change also takes place. The following chapters focus primarily on the three aspects of change: intersectoral shifts in labour demand, job change, and labour turnover. They also investigate certain other aspects of change that help to delineate how much reallocation is taking place and who bears the greatest burden during the process of adjustment.

The Issues

This study has two objectives. The first is to provide a description of the amount of change that the economy has managed to absorb. The second is to ask whether there is a particular pattern to the process. It may be that the type of adaptation that normally occurs can handle the repercussions of certain events at relatively low cost; that is, the changes can be accommodated by the rates of turnover that normally occur both in jobs and in worker separations. Throughout the study, the two issues are interwoven. The amount of change and its pattern are studied jointly at different levels. First, the degree of change in employment that goes on between industries is examined. Second, the amount of employment that is shifted between firms and establishments within industries is explored. Third, the extent of worker separations is detailed. Finally, the mobility of workers across occupations, regions, and industries is discussed. Throughout, a series of questions are posed. A brief description of some of the questions, the issues behind them, and the answers provided in the main text follows.

The Extent of Interindustry Resource Reallocation

How Rigid Is the Structure of the Canadian Economy?

1) How large are interindustry movements that are the result of the growth of some industries and the decline of others?

An often-expressed concern is that change brought about by the decline of some industries and the rise of others places great strain on the economy's ability to adapt. In the first two decades of this century, the automobile industry replaced carriages and wagons; more recently, the electronic computer has been displacing the conventional typewriter. These are examples of replacement occurring at a relatively narrow level of industry definition. Shifts also occur between broadly defined industry aggregates. Over the course of the last 50 years, there has been an exodus from agriculture; recently, the service sector has grown relative to the goods-producing sector. This has led to a debate about the nature and existence of the de-industrialization phenomenon. It has also raised concerns about whether the economy can adapt to the changes that are forecast to occur in the future.

Chapter 2 focuses on the amount of reallocation of employment associated with the rise and decline of different industries. Over the past three decades, the Canadian economy has been subjected to various forces affecting change. Trade liberalization has led to substantial changes in import penetration and export growth. Tastes have changed and consumer demand has shifted from one product to another. Productivity changes have had different impacts across the industrial system. The relative importance of different industries has changed as a result of all these forces.

Summary statistics are used to describe the amount of short- and long-run change in the allocation of labour because of these interindustry shifts in relative importance. Two types of summary statistics are used. The first catches change due to shifts in the relative importance of different industries. The second looks at the amount of change due to a reduction in actual, rather than relative, employment levels in some industries.

The main purpose of Chapter 2 is to provide a benchmark for the subsequent discussion of labour reallocation using job-change and labour-turnover data. The values of the indices of interindustry change derived in the chapter demonstrate that, while the cumulative effect over a decade of interindustry shifts has been large, the annual rates of change are quite small. Somewhere around 1 percentage point of employment is reallocated each year on a permanent basis over the long run. This is small relative to the amount of change later measured for both firm employment and worker turnover.

A second finding of the chapter is that change, when measured over the longer run, is less than when measured over the short run. The amount of change that occurs by comparing points 10 years apart is not just the sum of the change measured on a year-to-year basis for each of the intervening 10-year periods. It is considerably less. Thus, a good portion of the short-run changes in industry shares is reversed in the long run. The short run, then, contains a considerable transitory component. This means conclusions about the amount of structural change should not be derived from annual change rates.

The Extent of Firm-Related Job Turnover

Piercing the Veil: Is There Much Intraindustry Change?

2) Is the amount of intraindustry movement in labour large relative to the amount of interindustry change? Is the amount of job change due to the rise and fall of firms and establishments large relative to the amount that is measured when just employment at the industry level is used?

Measuring change by examining the extent to which employment is shifted from one firm to another captures two aspects of change. Some is due to firm growth and decline associated with industry growth and decline; part is associated with the competitive process that goes on within each industry – in growing and declining industries alike. Measuring job growth and decline of firms and comparing the results to interindustry movements, in Chapter 2, demonstrate the relative importance of interindustry, as opposed to intraindustry, shifting.

Chapter 3 examines how much of employment growth and decline in the manufacturing sector is due to the growth and decline of establishments and firms and compares this to net employment change. Chapter 4 does the same for a range of sectors in addition to manufacturing. Each chapter focuses on measures of job turnover to detail the amount of change that occurs as establishments and firms grow and decline.

Job turnover is defined as the number of jobs lost because some firms and establishments decline in size plus the number of jobs gained because other establishments increase in size. In terms of Figure 1-1, this is $B + C$. The difference between the two totals is the net number of jobs created ($B - C$). If substantial job turnover is occurring, focusing on the net percentage of jobs created will give a misleading impression of the degree of change that is continually taking place.

Whether for the manufacturing sector or for the economy as a whole, annual gross job turnover was large in the 1970s and early 1980s. It was at least 18 per cent of total employment. Gross job loss made up about half of this. These figures are high relative to the amount of change in total employment – the net change of growth and decline. Net rates of employment change in manufacturing generally varied between ±3 per cent annually in the 1970s. It is clear that focusing on the number of net jobs created understates the amount of employment churning that has occurred. It is also evident that employment turnover when measured at the firm or establishment level is much greater than when interindustry shifts alone are estimated. This stresses how much more important the intraindustry competitive process is in potentially reallocating workers than is the interindustry process that is related to the growth and decline of whole industries.

An understanding of the size of the underlying turnover process is of considerable importance in assessing the implications of various predictions about the effects of changes in public policy. It is vital to have a good idea of the amount of employment shifting that the economy has proven capable of absorbing in the past. For example, the Economic Council of Canada has recently suggested that the Canada-U.S. Free Trade Agreement might lead to a reallocation of 4.5 per cent of employment over a 10-year period – or some 0.5 per cent a year.[4] This is large relative to net employment-growth rates over the last decade. It is not large, however, relative to the gross job-loss rates outlined in Chapters 3 and 4.

What Is Important for Job Turnover: Incumbents, Parvenus, or Failures?

3) How much of growth and decline is due to entry and exit and how much is due to the adjustment of continuing firms or establishments?

To many people entry and exit is a phenomenon of little importance. Entry and exit are perceived to involve small firms and, therefore, to be a fringe phenomenon. Job-change studies are regarded as interesting but capturing primarily the short-run phenomenon associated with continuing firms and having little to do with structural change. It is important to note what effect entry and exit have on job-change measures, and how important these changes are over time.

Chapter 3 examines the importance of entry and exit in the manufacturing sector. When growth and decline in the manufacturing sector are measured over adjacent years, entry and exit account for about one-sixth of total job gain or loss. However, these results change when five- and 10-year periods of comparison are used. Entry and exit become just as important as expansion and contraction in the continuing sector. This is the result of lower rates of change calculated for continuing firms when the longer periods are chosen and the fact that long-run entry and exit rates do not decline relative to the short-run rates calculated here. Entry and exit inexorably replace the present firm population. The percentages of employment affected by exit and entry in the long run are substantial. They range upwards of 20 per cent in the 1970s.

The proportion of gross job loss accounted for by exit has important implications on the costs and efficacy of the adjustment process. Exit potentially involves different costs of adjustment because a complete unit is closed down; while contraction of existing units is likely to involve adaptation at the margin. It may be that workers with a wide range of ages, seniority, and firm-specific capital are released in the first case; while the second may involve only those whose attachment to the industry is marginal and whose skills are readily transferred elsewhere. This would make exit more costly than contraction. The relative costs of adjustment through exit as opposed to through contraction of continuing firms will depend on a number of other factors – the age of the exiting firm, the number of years of continual contraction experienced by the continuing firm. Nevertheless, as a first approximation the exit ratio provides a useful summary statistic of the extent to which decline results in closures.

The proportion of gross job gain accounted for by entrants serves as a measure of the importance of entry barriers. Where new growth comes primarily from existing firms, as opposed to new firms, then barriers to entry are higher. Entry barriers are more likely to be associated with market imperfections. Such imperfections can delay the adjustment process in a number of ways. The most obvious is that they reduce the infusion of new ideas and new technology into an industry. This in turn reduces the demand for new workers, which means there will be fewer opportunities for those who are being displaced by the natural decline process that is continually taking place.

Chapter 4 details differences in these ratios across broadly defined sectors for the period 1978-86. Some sectors, like primary, have a very high proportion of change in exits and entrants; others, like transportation, are at the other end of the spectrum, with most change coming from existing firms. The service sectors have a higher proportion of change originating in entry and exit than does the manufacturing sector.

Does Time Make a Difference?

4) Do the estimates of job change vary if they are measured over different time periods? What does this reveal about the stochastic process that governs the rise and fall of firms?

Measures of job change can be derived from comparing the status of producers in periods that are adjacent to one another or that are separated by a number of years. A comparison of the two results will reveal how much of the year-to-year change is transitory and how much is permanent. If much of the year-to-year change in continuing producers is the result of seasonal or short-run output fluctuations, then continuing firm turnover rates measured by comparing two adjacent years will not reflect the extent to which job positions are being released for redeployment in the long run. In the short run, much of the change will be temporary from the point of view of the firm. If a substantial number of lost positions are regained, then the number of workers who were displaced on a permanent basis may also be small. In this case, the short-run job-change rate will overstate the amount of change that actually involves a transfer of labour between different firms.

The issue as to whether it is the short- or long-run job-change rates that best measure worker dislocation is addressed in two steps. First, annual values of job-loss rates are calculated by comparing employment in firms both for short periods (adjacent years) and for longer periods (five- and 10-year periods). Second, the short- and long-run values of job-loss rates are compared to the annual rate of permanent layoffs derived from worker separation data to find which more closely approximates the permanent-layoff rate.

Measures of change are used not only to tell us how much change is occurring but also to characterize the extent to which competition is extensive. And knowledge of the latter is important if the degree of flexibility in the market system is to be evaluated. The larger is the transitory component of continuing firm growth and decline, the lower will be any estimate of the extent to which the growth and decline process leads to a genuine change in the rankings of firms within an industry. In these circumstances, short-run changes in relative shares should not be used to infer the degree of competition.

The results reported in Chapter 3 show that there is a very significant difference between the long and short-run rates of expansion in the manufacturing sector. Chapter 4 confirms that similar differentials exist for other sectors.

Examination of the difference between the short- and long-run rates also yields useful information about the importance of entry and exit. Entry may either be characterized as temporary – a situation where entrants generally fail quite quickly – or important in some permanent sense. In the latter case, the cumulative effect of entry can be important because growth of some entrants is sufficient to offset those which quickly exit, and, over time, the cumulative effect of succeeding age cohorts is enough to account for a substantial portion of market share. It is demonstrated in Chapter 3 that the long-run entry rates, when annualized to allow for the difference in period, are about the same as the short-run yearly rates. This means that in every cohort, there is enough expansion of existing firms to offset the high failure rate of recent entrants. Over time, the cumulative effect of entrants is substantial.

If most exits come from recent entrants, then the longer-run cumulative rate of exit should be the same as the short-run rate. In this case, most recent entrants will have exited over a short period and thus the cumulative exit rate will approach an asymptote quite quickly. Equivalently, the annualized long-run rate derived from the cumulative rate will gradually decline to zero. The evidence provided in Chapter 3 on the manufacturing sector and in Chapter 4 on other sectors refutes this view of the world. In contrast to annualized long- and short-run contraction rates in the continuing sector, the annualized long- and short-run exit rates are almost the same. Exit then is a phenomenon that is not restricted to a fringe group that is constantly being recycled.

Entry and Exit: Do They Matter?

5) Are entry and exit a fringe phenomenon or do they affect many firms across the firm size distribution? Do growth and decline affect small size classes in a different fashion than the larger classes?

The comparisons of long- and short-run rates also serve to emphasize the rate at which the present firm population is being replaced. But care must be used to interpret the meaning of the differences. In a mechanical sense, the cumulative long-run entry rate must be less than the sum of the short-run rates. The mean annual short-run rate is positive; but the annualized long-run rate, if calculated from some primordial start-up date, must be very small. Similarly, there will no doubt be some future, as yet unspecified, date at which time the present firm population will all have disappeared. If it is sufficiently advanced, the annualized long-run exit rate must too be very small and lower than the mean annual short-run exit rate.

This is not the comparison being drawn here between the long and short run. Long and short run refer to yearly data and to longer periods of five and 10 years only. A comparison of these rates yields answers to whether the present population is being replaced and at what rate – not how long it took to generate the present population. This is a useful exercise, since there is a tendency in some quarters to admit that the present population developed through a birth, death, and growth process but to treat it as if that process had terminated. There is a tendency to regard the present incumbents as thoroughly ensconced in positions of dominance from which they are unlikely to be toppled. The data presented in Chapters 3 and 4 and later in Chapter 8 deal with this issue.

Chapter 8 builds on the earlier work of Chapters 3 and 4. In those chapters, the differences between long- and short-run rates were used to show that the effect of entry and exit cumulates over time – or rather how rapidly it cumulates over time. By examining the effect of entry and exit over time and across size classes, Chapter 8 shows how widespread the effect of the turnover process is. Exit is spread relatively evenly across size classes; entry tends to be concentrated in the short run in the smallest classes. As the period of time over which the importance of entry is measured is lengthened, entrants grow and move up the size class ladder.

Chapter 8 also addresses the issue of whether it is just in the smallest firm size classes that the effects of entry and exit and expansion and contraction in the continuing sector can be found. Considerable attention has recently focused on the fact that net job creation in the smallest size classes is positive, but that in the largest size classes it is either negative or of much lesser importance. The impression is left that growth and decline elsewhere are insignificant. Chapter 8 shows that this view is incorrect. For example, in manufacturing between 1978 and 1986 small firms accounted for one-third of gross job gain and large firms for 40 per cent; in terms of gross job loss, the proportions were one-tenth and nearly 70 per cent, respectively. Growth and decline are thus pervasive across all size classes; in other words, there is substantial intraindustry change in firm positions across all size classes as a result of competition. Furthermore, such patterns may be found whether industry or sector employment growth is positive, negative, or stationary.

Are Patterns of Adjustment Different?

6) Are patterns of entry and exit across industries and over time different? Do entry and exit respond differently to growth rates, in particular? What do the differ-

ent patterns suggest about the nature of the adjustment process?

Understanding the patterns of exit and entry is important for two reasons. In the first place, knowing the pattern of each by itself provides useful information. Consider the characteristics of the exit rate. There is an inevitable tendency to think about all adjustment as incremental – that policy changes will add to the number of failures. If this is the case, then exit rates should be highly sensitive to economic conditions. This is not the picture of exit rates that emerges in Chapter 3 from a study of the Canadian manufacturing sector over time, of other sectors in Chapter 4, or of other countries in Chapter 5. Exit rates are generally unrelated to economic conditions, except in the worst of circumstances.

A constant and relatively unvarying flow of labour and capital is being released by exiting producers and made available for reallocation. Exit is a manifestation of failure. Many events affect each firm: macroeconomic conditions, trade policies, environmental controls, and industrial relations problems. A relatively stable percentage of producers are unable to cope with these problems at any one point in time. Since this stream is relatively fixed, it will be difficult to pinpoint which portion is the result of specific economic events. Moreover, the fact that there is a constant stream of adjustment taking place suggests that many workers are regularly affected by the rise and fall of firms and that there is a need for general programs of assistance.

Understanding the pattern of entry by itself is also important. In some circles, entry is regarded as an unimportant phenomenon. Large firms are portrayed as the medium through which government programs are best delivered. If entry is a dynamic force that responds quickly to growth in an industry, then concentrating on large firms may not be desirable or even required. This study demonstrates that entry is important. Moreover, the results of Chapter 3 show that entry readily responds to economic growth in the manufacturing sector. This is confirmed in Chapter 4 for other sectors and in Chapter 5 for other countries. In Chapter 9, a regression analysis is used to further pursue and confirm this observation. Finally, the analysis contained in Chapter 8, which examines the components of job growth and decline by size class, shows that entry affects all size classes and the extent to which entrants may start off being small but grow over time.

Although each pattern of the entry and exit components taken by itself yields useful information, it is their relationship to one another that is even more important. This relationship describes the type of adjustment process that takes place as one industry supplants another in importance. If exit rates are higher in slower growing industries than in faster growing industries, but birth rates are relatively constant across the different growth classes, then adjustment comes from increasing the rate at which workers are forced to seek new jobs. If, on the other hand, exit rates are relatively constant across growth classes and birth rates more variable, the adjustment process only requires that workers, who would normally be seeking jobs because of job loss, do so in industries where there are more new opportunities. Adjustment may be said to come on the entry rather than the exit side.

The evidence indicates that there is a high and relatively constant "natural" or "normal" or "typical" exit rate and a variable entry rate. This is found whether time series or cross-section data are used. In Chapter 3, it is demonstrated that annual rates of entry to the manufacturing sector are more variable than exit rates. A cross section of cumulative entry and exit rates for four-digit manufacturing industries shows that entry rates vary more across different growth classes than do exit rates. Similar results are found for other sectors in Chapter 4, for other countries in Chapter 5, and in the regression analysis contained in Chapter 9.

Is Canada Unique?

7) Are the patterns of job growth and decline unique to Canada?

The question of cross-country comparisons of gross job gain and loss inevitably arises. The OECD (1987) focused on such comparisons in order to find out whether differences in net employment creation were related to differences in gross job gain or loss or even to entry and exit rates. Cross-country comparisons are also of interest here, but for different reasons. The patterns of job gain and loss that are presented here for Canada have not been thoroughly documented previously; in some cases, they have been derived from new data sources that have not been subject to the same tests of time that traditional data sources have received. The results of job-turnover studies from other countries on the questions posed above serve as corroborative evidence for the conclusions drawn about the Canadian experience. Chapter 5 shows that similar patterns of growth and decline can be found in other countries. This reinforces the generality of the conclusions drawn about the Canadian experience.

The Size and Pattern of Labour Force Separations

The previous questions all focused on job changes directly resulting from producer growth and decline. Labour separation data can be used to elaborate on certain aspects of change that the use of job-change statistics alone conceal.

Do Workers Separate because of Firm Behaviour?

8) Is there a component of total worker separations that is related to job change and how does it compare, in terms of absolute size and pattern, to changes in employment that come from the job-change studies?

In order to answer this question, the history of worker separations is studied in Chapter 6. The total of all separations is large. It is in excess of 40 per cent of all individuals with jobs, whether all sectors are examined or just manufacturing.

Separations are divided into various components. Separations may be thought of as "involuntary," in that they arise from forced layoffs, or "voluntary," in that they stem from quits and other attritions initiated by the worker. Each of these categories is about equally important in terms of separations.

The layoff or displacement component of separations is the one that most directly results from job loss. However, many layoffs are temporary in that the worker returns to the same employer after a temporary absence. When the temporary component is removed from the layoff rate, the permanent-layoff rate approaches the gross job-loss rate. Annual rates of gross job loss are translated directly into permanent separations because of layoffs. Although much of the job change measured annually is temporary for the firm, it is not for the worker.

Chapter 6 also details the extent to which there is a second component, attritions, that transfers workers from one employer to another, over time. The attrition component – quits and other – also has a temporary component. When it is removed, the number of permanent attritions is found to be greater than that arising from layoffs for both the manufacturing sector and for all sectors taken together. This is significant because the greater is the number of separations due to quits and other attritions, the larger is the annual worker turnover available to facilitate adjustment without resorting to layoffs.

The issue of the time pattern of the various components of the separation rate is also addressed in Chapter 6. The permanent-layoff rate is found to be relatively time invariant – as it should if it reflects the job-loss component associated with establishment failure and decline. It is also the case that the "voluntary" component (attritions) has a large degree of intertemporal stability.

Interest centres not just on whether the components of the overall separation rates exhibit stability over time, but also whether they are related to each other. Attrition levels were found, for both manufacturing and all industries, to be significantly correlated with permanent layoffs. This suggests that some of the same forces that cause producer growth and decline and thus high rates of job loss also cause higher attritions. However, the relationship between permanent-layoff and quit rates did not hold across all the years that were examined or for all periods when changes in the permanent-layoff and quit rates were correlated with each other. There is a component of the attrition rate that is independent of the forces that affect job-loss rates. Industries will differ in the extent to which attritions can be relied upon to cushion adjustment.

Also examined is the extent to which economic conditions affected permanent layoffs, quits, and other reasons for separating. It appeared that at the broad aggregate level, macroeconomic conditions did on some occasions affect separation rates. For example, the recession of the early 1980s led to the highest permanent-layoff rate and lowest quit rate in both the economy and the manufacturing sector. Since "voluntary" separations do respond to overall economic conditions, a buoyant economy facilitates the adjustment process in that more of the job loss associated with restructuring can be accommodated by attritions as opposed to layoffs.

At the level of the individual industry, however, separation rates prior to the 1982 recession are not very responsive to local economic conditions, as measured by the industry employment-growth rate. Such a result is not surprising in view of the considerable intertemporal stability in industry separation rates reported above. Hence, if there are explanations for differences in levels of industry separation rates, they do not lie just in the industry employment-growth rate. Rather industry-specific factors, such as wage rates, the degree of competition, and technological change, are more important. Thus there is both a macroeconomic and industry effect in determining separation rates.

The Mobility of Labour Force Separations

Are Workers Mobile?

9) When workers separate, do they exhibit rigidity in their search patterns across employers, industries, and occupations?

The final issue dealt with in this study is the extent to which labour turnover is associated with a broad or only a narrow reallocation of employees. The previous questions deal with the size and pattern over time of various components of job and labour turnover. The last question addresses the degree of mobility exhibited by workers who separate from their employers. The degree of mobility has implications for the costs of adjustment. If workers who separate from their employers move to another employer in the same industry who can offer similar work, adjustment to trade liberalization that requires employment reductions in several related sectors may be difficult. On the other hand, if they are found to change industries, occupations, and regions relatively frequently, structural problems will be less important. If considerable interindustry or interoccupational movement is the result of the normal search process, and this group dominates those who normally separate each year and who provide the adjustment cushion, then adjustment is less costly.

These issues are addressed in Chapter 7 with several case studies of worker mobility. It is generally the case that very large percentages of the unemployed change employers, industries, and occupations. Studies of transfers across industries indicate that workers come from, and return to, a wide variety of other sectors for industries like steel, leather, shipbuilding, and automobiles. The evidence suggests a highly mobile work force.

Some Conventions

In preparing this study a considerable number of data sources and published studies have been used. In many cases the same concept is measured in a different way, frequently with a nomenclature of its own.[5] In other instances, essentially the same result is presented in different ways.[6] In this study we have used a standard set of terminology to describe the same concept, although the different data sources might have used a variety of terms. Nevertheless considerable care is taken to explain both in the text and, more specifically, in the appendices the similarities and differences between the various ways a particular concept is defined in a given data source.

* * *

This study, then, provides quantitative evidence on the issues posed above. While stimulated by a debate over trade liberalization, the results have implications in other areas. They provide a benchmark against which the expected impact of other policies can be compared – whether the expected added employment dislocation of a particular policy will add significantly to the ongoing natural dynamics of the economy.

The findings may also be used to ascertain the ease with which change can be ascribed to a particular cause. In order to design programs that deal with the impact of a particular policy, the effects of this policy need to be separated from the multitude of other factors that influence economic life. The results reported herein suggest that there is a substantial amount of exogenous or natural change relative to the predicted impact of a particular policy. As a result, this means that attempting to isolate the effect of any particular policy for the purposes of administering adjustment programs will be difficult.

2 The Pace of Change and Interindustry Structural Adjustment

Interest in the amount of structural change that the Canadian economy has experienced is not new. Studies have focused on the post-Second World War shift from agriculture to services and whether the pace of such change has quickened (Charette et al., 1986; Picot, 1986*a* and 1986*b*). The debate about de-industrialization and the need for restructuring in the face of falling trade barriers is often conducted at this broad level. Changes in the pattern of industrial activity are seen as involving the reallocation of workers through job loss and job gain. The quicker the pace of such change, it is argued, the greater will be the probability that job loss will be associated with worker displacement and the more serious will be adjustment problems. This chapter examines the extent of interindustry change and comments on the degree to which measures of change can be used to draw inferences about worker displacement.

Change can be measured by the shifts in the distribution of either outputs or inputs among industries. For the purposes of this study, with its emphasis on labour, attention is concentrated on employment shifts. Such shifts can occur in response to output changes that reflect a number of factors: from changing tastes, different income elasticities, emerging demographic trends, changing relative prices brought about by productivity growth differences, to shifts in trade patterns. Structural change in the demand for an input, such as labour, at the industry level depends, however, only partly on relative output changes across industries. Structural shifts in labour requirements will also depend on relative changes in output per worker, which in turn is a function of changing factor intensities (whether more capital relative to labour is being put in place), and the type of technological change (whether it is labour-saving, neutral, or labour-using).

The examination of interindustry structural change in this study focuses on several issues. The first is the extent to which the distribution of employment among sectors, industries, and occupations has changed over time. Building this foundation is necessary because discussions of change often proceed with poorly founded assumptions about the degree of change that the economy has absorbed in the past. By examining the past experience of the Canadian economy in this area, it is possible to place predictions of future change in perspective. This chapter also asks whether the rate of change has increased in recent years. There is a perception in some quarters that the pace of change has quickened and is subsequently creating problems of adjustment. The third question examined is the extent to which change can be divided between cyclical and structural components. If short-run changes are cyclical and often reversed in the longer run, then their use to measure fundamental structural shifts is questionable. Finally, the chapter focuses on change within the manufacturing sector in particular. Debates over the extent of de-industrialization and the impact of trade liberalization tend to focus on this sector. It is, therefore, important to ask whether manufacturing exhibits unique structural characteristics that suggest the process of change will lead to particular difficulties.

Measures of Structural Change

Before proceeding, the notion of structural change adopted here needs clarification. There are many aspects to structural change. These encompass such characteristics as the degree of firm concentration, the amount of foreign ownership, and the type of organization units (single industry as opposed to multi-industry firms). (See McFetridge, 1986, for a more complete discussion.) Those who are interested in the ability of the economy to adapt are accustomed to ask whether industry performance relates to such characteristics. The purpose of this chapter is different, however, since it examines the degree to which sectors, industries, and occupations change in relative size, with employment used as the size indicator.

The Dissimilarity Index

A widely used measure of structural change is the dissimilarity index (see, e.g., Turvey, 1977; Lawrence, 1984; Charette et al., 1986; Picot, 1986*a*). It is defined as half of the sum of the absolute percentage point difference for each industry's (or sector's or occupation's) share of total employment between two points in time.[1] By dividing by two, it averages gainers and losers. The index will vary between zero (no change in industrial structure) and 100.00 (a complete reversal of structure, whereby a very small or new industry comes to dominate employment). Thus the dissimilarity index provides a measure of the total relative shift in employment from losers to gainers.

Change can be calculated over a given period by summing annual year-to-year or short-term values of the dissimilarity index (SI) or by calculating the index by comparing employment size distribution at the beginning and end of the period – the longer-term or cumulative change index (CI). The short-term annual index resets the base share used for comparison each time the index is calculated.[2] The cumulative index fixes the base year and calculates the change in subsequent (or preceding) periods relative to the base year.[3] For some purposes, it is useful to consider not the total change that occurs over a period, but the annual average pertaining to that period. This is done here by dividing the total change, using either the CI or the sum of the SI, by the number of years in the period being considered, to yield ACI and ASI, respectively.

Some Caveats

The dissimilarity index is useful for measuring changes in the distribution of employment by sector, industry, or occupation. Dissimilarity indices should not be used to draw conclusions about the adequacy of the amount of change without additional information on, for example, the "supply" and "demand" for structural change. A low rate of change may mean there is little need for a reallocation of resources or that the economy has been unable to adapt. Adaptation comes from the death and birth process. Deaths do not require any particular talent. Successful births do. If the emergence of new firms or the expansion of existing firms is somehow stultified, then resources will not shift at the rate required to keep the demand for labour at its full employment level. As such, a low rate of structural change may be indicative of an inability to adapt.

The change or dissimilarity index is used here to provide an overall picture of structural change at the level of the economy and within the manufacturing sector. This provides a benchmark or frame of reference for subsequent calculations of employment change at the level of individual microeconomic agents – workers and firms.

Interest in interindustry reallocation is frequently associated with a concern about the extent to which this type of change forces a reallocation of the work force. The dissimilarity measure can be thought of as the percentage of resources that are moving out of sectors that are losing relative position, on the basis of employment share, into those that are gaining. However, caution needs to be exercised in using the dissimilarity index to infer the extent to which existing workers are forced to relocate, for two reasons.

In the first place, only in a closed system in which employment consists of the same set of individuals in the initial and terminal years of the comparison will the dissimilarity index measure the extent to which labour is forced to move. Typically, this is not the case. Some industry growth will be accommodated by entrants to the labour force; some industry decline by exits such as retirements. As such, the actual percentage of the labour force that is forced to change jobs will be less than is indicated by the dissimilarity index.

A second problem with the use of the index is more fundamental. The dissimilarity or structural change index will take on a nonzero value as long as the growth rates for all industries are not the same.[4] The greater is the variance of growth rates about the mean growth rate, the higher will be the value of the change index. All industries may – indeed usually do – have a positive but different growth rate, and shares will change over time. Change, then, as measured by this index, involves a decline in the *relative* and not necessarily the *absolute* size of some industries. Thus, nonzero values of the dissimilarity index do not necessarily indicate that workers will be forced to change jobs because of a decline in industry demand.[5]

In view of the difficulty of interpreting the dissimilarity index as an indicator of labour market adjustment problems, a measure of change that considers only those industries that suffer an absolute decline in employment is preferable. Absolute decline is more likely to imply that some resources may have to be released. Adjustment costs are generally presumed to be higher for those who are forced to relocate. As a result, this chapter presents other indices that are based on the rate of decline in only those industries that suffer employment losses over various periods. These indices are calculated relative to total employment and just to employment in the declining industry. The first base allows an evaluation of the overall importance of declining industries; the second, the rate at which labour tends to be released from the industry in decline.

It should be noted that, even in the case of declining industries, the actual decline in employment may not result in the forced relocation of labour. Some workers may retire. Others may separate for reasons unassociated with the decline of the industry. Aggregate measures that examine employment totals at two different points in time will miss a great deal of underlying change both in firm and in worker behaviour.[6] The same problem exists with the dissimilarity index. These issues are addressed in subsequent chapters.

Structural Change in the Economy

During the past 30 years, there have been dramatic shifts in the importance of different sectors as sources of employment (see Picot, 1986*a*). Table 2-1 contains the shares of employment accounted for by the goods-producing sector (agriculture, manufacturing, construction, and other), as opposed to the service sectors, in 1951, 1961, 1971, and 1981. Over this time period, the share of the experienced labour force in the goods-producing sector has declined from 53.1 to only 33.8 per cent. The commercial service sector concomitantly has grown from 34.5 to 44.0 per cent. The noncommercial (public) service sector has grown from 12.4 to 22.1 per cent.[7] The trend to services is responsible for the proposition that Canada is becoming a service-based economy.

The relative decline in the goods-producing sector is primarily the result of a contraction in the agriculture sector. Less than 30 per cent of the goods-producing sector's decline is accounted for by manufacturing. In the service sector, there has been no relative expansion in the distributive trades (transportation, communications, wholesale, and retail). Consumer services have expanded in terms of relative share but not by as much as producer services (management services, finance) and noncommercial services (education, health, public administration).

Although the goods-producing sector has fallen in relative importance, this has not been associated with a

Table 2-1

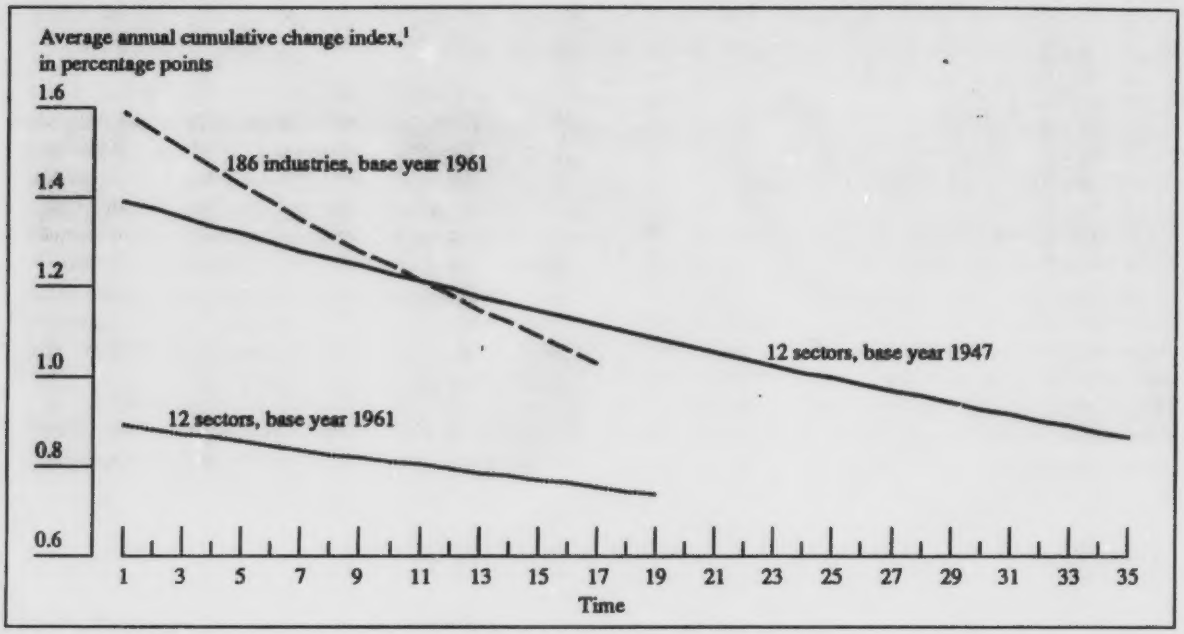
Distribution of the Experienced Labour Force,[1] by Sector, Canada, Selected Years, 1951-81

	1951	1961	1971	1981
		(Per cent)		
Agriculture	15.6	9.9	5.8	4.1
Manufacturing	24.7	22.1	21.3	19.1
Construction	6.2	6.9	6.7	6.5
Other goods-producing industries[2]	6.6	5.3	4.1	4.1
Total goods-producing industries	53.1	44.2	38.0	33.8
Distribution services[3]	23.3	24.2	23.5	23.8
Producer services[4]	3.8	5.4	7.2	9.5
Consumer services[5]	7.3	8.6	9.2	10.8
Total commercial service industries	34.5	38.2	39.9	44.0
Noncommercial services[6]	12.4	17.6	22.1	22.1
Total service industries	46.9	55.8	62.0	66.2
Total, all sectors	100.0	100.0	100.0	100.0

1 The experienced labour force is defined as workers either employed at the time of the census or unemployed, but who had worked during the previous 18 months.
2 Mines, quarries, and oil wells; utilities; forestry; and fishing.
3 Transportation and storage; communications; wholesale and retail trade.
4 Services to business management (e.g., accounting, engineering, legal and management consulting firms); finance, insurance, and real estate.
5 Accommodation and food services; amusement and recreational services; miscellaneous services.
6 Education; health and welfare services; religious organisations; public administration (government).
SOURCE Picot (1986*a*), Table B-4, p. 100.

Chart 2-1

Average Annual Employment Share Change in the Economy, Canada, Various Periods and Levels of Classification



1 See text for definition.

SOURCE Charette et al. (1986), Table 2-2, p. 69, and Table 2-7, pp. 82-3.

decline in employment everywhere. Certain sectors have experienced strong growth in employment even though their relative share declined. The experienced labour force in manufacturing grew by 9.4 per cent between 1951 and 1961; by 28.7 per cent between 1961 and 1971; and by 24.9 per cent between 1971 and 1981.[8] Construction grew by 37.8, 29.4, and 33.9 per cent over each of the three decades. Only agriculture suffered a decline in the absolute number of workers in each decade.

Two studies have used the dissimilarity index to measure the degree of interindustry structural change in the economy. Picot (1986*a*, p. 22) applies it to the experienced labour force using the census years (1951, 1961, 1971, and 1981) and a 44-industry (two-digit) classification of the economy to examine long-term structural change. When all industries are included, the value of the cumulative index (CI) is 10.8 percentage points for 1951-61, 10.0 for 1961-71, and 6.8 for 1971-81.[9] When agriculture is excluded, it is 8.6, 8.7, and 6.2 percentage points for the same three decades. Transformed to an equivalent annual rate, the latter values of the dissimilarity index produce an annual percentage point change (ACI) of 0.86 for the period from 1951 to 1971, and 0.68 from 1971 to 1981. The amount of structural change has decreased over the three decades, irrespective of whether agriculture is included or excluded. In keeping with the latter finding, the variance in decadal growth rates across industries was lowest in the 1971-81 period (Picot, 1986*a*, p. 23).

Charette et al. (1986) also use the dissimilarity index to study the extent of structural change, but they apply it to annual rather than census data. Employment shares for 12 major sectors from 1947 to 1982 are used.[10] The average annual year-to-year change (ASI) at this level for the entire period is 1.3 percentage points. The CI, for the period 1947 to 1982, shows a change of 31.4 percentage points or about 0.9 of a percentage point per year on average. Long-run structural change is less than the sum of short-run changes. The ACI is plotted in Chart 2-1. This curve is derived from a regression of the logarithm of the average annual cumulative change over time, details of which are presented in Appendix A. It declines steadily, showing that short-term change contains an element that is reversed in the long run.

These results show that less than 1 per cent per year of total employment is being shifted as the result of long-run structural change; however, this finding comes when both studies use a relatively high level of industry aggregation to measure structural change. The level of disaggregation will likely affect the value of the index used to measure structural change. How much it affects the results can be gauged from a comparison of the cumulative index calculated over 12 sectors and over a 186-industry breakdown for the period 1961-79.[11] Over this period, the average annual change derived from the CI was 0.70 of a percentage point of total employment per year for the 12-sector breakdown of the economy; it was 1 percentage point for the 186-industry breakdown of the economy. The ASI was 1.0 percentage point across the 12 sectors for the period 1961-79, but 1.85 percentage points over the 186 industries. Thus, estimates of the amount of structural change increase when a finer level of industry detail is used. Even so, using either level of aggregation indicates that 1 per cent or less of total employment is being shifted in a permanent way from one industry to another on an annual basis.

Both the average annual measures derived from the cumulative long-term indices based to 1961 using the 12-sector and the 186-industry breakdowns are also graphed in Chart 2-1. As before, the plots are derived from a regression of the logarithm of the ACI over time (see Appendix A). Two observations are relevant.

First, in comparison to the 1947 12-sector base curve, the 1961 base plot starts at a lower level but declines over time at about the same rate.[12] The difference then in the two measures for the different base periods is partially a result of short-term effects that start the 1947 curve at a higher level. This suggests caution should be exercised in concluding there has been less structural change recently, since the base year chosen may influence the estimates. This issue is investigated further below.

Second, while the 186-industry disaggregation has a higher annual average change derived from the cumulative index than does the 12-sector disaggregation, the amount of change in the former case declines more rapidly over time, as Chart 2-1 demonstrates. As a result, the estimates of long-term change derived from the different levels of aggregation are much closer than are estimates of short-run changes. Therefore, the level of aggregation matters less when average rates of cumulative change are measured over long periods compared to short ones.

Structural Change in the Manufacturing Sector

Because of the growth in the service sector, manufacturing is broadly perceived as the area that has had and will have the most adjustment problems. The claim that de-industrialization has set in, as contentious as it may be, has conditioned discussion in this area (see Economic Council of Canada, 1983). For this reason, it is useful to focus on the amount of change that has occurred in this sector alone.

Over the three decades since 1951, the level of employment in the manufacturing sector as a whole has expanded. However, the overall growth in manufacturing masks considerable differences across sectors. An examination of the distribution of employment across two-digit manufacturing industries from 1951 to 1983 reveals that there are few industries that have consistently declined. The industry shares of employment are presented in Table 2-2 for selected years between 1954 and 1983. The sign of the change in employment share between periods is presented in Table 2-3. On the basis of sign change, only two industries exhibit continuous growth or decline. Rubber and plastics move up steadily, leather moves down every period. Elsewhere, the signs presented in Table 2-3 indicate that reversals in relative position generally take place.

Since these changes in sign may not reverse a trend, the shares for each industry were regressed on a time variable. The resulting industry coefficients and their level of significance are reported in columns 7 and 8 of Table 2-3. Only five more industries stand out as having a significant trend when a 5-per-cent level of significance is used. Tobacco, textiles, and knitting mills and clothing decline; transportation equipment, and printing and publishing increase.

In order to examine change within the manufacturing sector, both the cumulative (CI) and the year-to-year index (SI) were calculated from 1951 to 1983 using essentially the two-digit Standard Industrial Classification (SIC) level of industry aggregation.[13] Two separate base years (1961 and 1972) were used for the CI. Since the average annual change derived from the cumulative index declines over time, the use of 1961 and 1972 as base years allows comparison of structural change

Table 2-2

Employment Shares in the Manufacturing Sector, by Industry, Canada, Selected Years, 1954-83

	1954	1958	1963	1967	1972	1979	1983
				(Per cent)			
Wood products	5.85	5.39	5.75	5.03	5.65	6.11	5.44
Furniture and fixtures	2.08	2.05	2.24	2.26	2.42	2.23	2.14
Primary metals	8.30	7.27	7.26	7.37	7.48	7.34	7.24
Metal fabricating	7.09	7.16	7.33	7.88	7.83	8.04	7.05
Machinery	4.25	3.84	4.26	4.77	4.69	4.94	4.51
Transportation equipment	9.13	9.46	8.48	9.87	9.85	10.74	10.43
Electrical products	6.63	7.46	7.57	8.19	7.85	7.06	7.41
Nonmetallic mineral products	2.72	3.08	3.23	3.08	3.11	3.05	2.77
Food and beverages	13.37	14.22	14.15	13.39	13.07	12.99	13.89
Tobacco products	0.88	0.96	0.81	0.70	0.61	0.50	0.55
Rubber and plastic products	2.02	2.18	2.36	2.53	3.00	3.13	3.46
Leather	2.60	2.36	2.30	1.92	1.73	1.46	1.42
Textiles	6.94	5.01	5.06	4.75	4.79	4.04	4.04
Knitting mills and clothing	8.80	7.94	7.92	7.28	7.24	6.03	6.10
Paper and allied products	7.37	8.05	7.74	7.64	7.62	7.72	8.18
Printing and publishing	4.14	4.54	4.68	4.54	4.41	4.79	5.70
Petroleum and coal products	1.20	1.42	1.20	1.11	1.09	1.35	1.61
Chemical and chemical products	4.21	5.00	4.67	4.70	4.49	4.89	5.53
Miscellaneous manufacturing	1.80	2.59	2.98	2.98	3.06	3.00	2.55
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00

SOURCE Economic Council of Canada, CANDIDE database, based on data from Statistics Canada.

across the decades of the 1950s, 1960s, and 1970s. In the case of both the 1961 and 1972 base years, the CI was calculated both forward and backward over time. The results are reported in Table 2-4.

Whether the amount of cumulative change is calculated by going forward from 1961 to 1983 (column 1) or backwards from 1972 to 1951 (column 2), the path of long-term structural change is remarkably similar. The average annual cumulative change over the two decades is 0.28 of a percentage point in the first case, and 0.30 in the second case. There are, however, some differences over shorter periods. The average decadal changes both for the cumulative index and the year-to-year index are presented in Table 2-5. The average annual structural change indicated by the cumulative index is 0.59 of a percentage point of employment per year between 1951 and 1961 and falls to 0.36 in the period 1972-81. The decline is somewhat less if the effects of the severe recession in 1982 are added to the latter period.

Part of the difference between periods in the value of the average annual change yielded by the CI may be the result of differences in the amplitude of short-run cyclical variations. The values of the SI (Table 2-4, column 3) show that the greatest cyclical variations in share change occurred in the 1950s; the smallest variations took place in the period 1961-71. There is also a significant difference in the means of the year-to-year index for the first and second decades (see Table 2-5). Once again, this emphasizes the need for caution in concluding that structural or long-term change has increased or decreased over time.

Much of the year-to-year change involves reversible cyclical effects, since the cumulative index is much lower than the sum of the year-to-year changes. Over the two 20-year periods (1961-83 and 1951-72), the CI has a value of 6.22 and 6.29 percentage points of employment, respectively; however; the sum of the year-to-year changes is 25.83 and 27.52 per cent, respectively. Structural change over these 20-year periods is less than one-quarter of the sum of year-to-year changes. Much the same result can be found for shorter periods. Over the decades covered in Table 2-5, the measure of structural change derived from the CI ranges from one-quarter to about one-third of the sum of the yearly shifts. In the long run then, a considerable portion of the short-run change in the relative importance of different industries is reversed.

The nature of the relationship between average annual rates of change in the cumulative dissimilarity index for the manufacturing sector and the length of time expired from the base year used to calculate the index is graphed in Chart 2-2 for the 19-industry level of disaggregation and two base years (1961 and 1972). The relationship in each case was derived from a regression of the log of the average change (ACI) over time expired from the base year (see Appendix A). While the curve for the 1961 base series starts at a higher level than the one for the 1972 base, they approach one another over the long run. Thus, when cyclical factors, which differ markedly year by year and which affect the initial value of the index, are removed by averaging over a longer period, long-run structural change is similar for the two base years adopted here. Chart 2-2 also plots the annual change calculated from the cumulative index using a much finer level of industry definition – 118 manufacturing industries (taken from Charette et al., 1986, pp. 94-5). The index starts at a higher level, but it declines more rapidly. The average annual change after 10 years is about 1 percentage point and 0.75 of a percentage point after 17 years. As with the economy-wide index, disaggregation increases the amount of shifting; but even with the finer level of aggregation, it is only about 1 percentage point of employment per year when measured over a 10-year period.

Interest centres here on long-run change, not short-run fluctuations. As was demonstrated in Chart 2-2, the range of average values of the annual structural change using different base periods is smaller when calculated over longer periods. Conclusions about the amount of long-run change then are not very sensitive to the starting point chosen for the calculations if a long

Table 2-3

Sign of Changes in the Employment Shares in the Manufacturing Sector, by Industry, Canada, Selected Periods, 1951-83

	Sign of share change						Time trend[1]	*PROB* $T > 0$[2]
	1951-58 (1)	1958-63 (2)	1963-67 (3)	1967-72 (4)	1972-79 (5)	1979-83 (6)	(7)	(8)
Wood products	–	+	–	+	+	–	0.003	(0.96)
Furniture and fixtures	–	+	+	+	–	–	0.026	(0.32)
Primary metals	–	–	+	+	–	–	–0.101	(0.17)
Metal fabricating	+	+	+	–	+	–	0.076	(0.38)
Machinery	–	+	+	–	+	–	0.122	(0.08)
Transportation equipment	+	–	+	–	+	–	0.280	(0.04)
Electrical products	+	+	+	–	–	+	0.065	(0.55)
Nonmetallic mineral products	+	+	–	+	–	–	–0.001	(0.98)
Food and beverages	+	–	–	–	–	+	–0.071	(0.51)
Tobacco products	+	–	–	–	–	+	–0.075	(0.002)
Rubber and plastic products	+	+	+	+	+	+	0.245	(0.0001)
Leather	–	–	–	–	–	–	–0.211	(0.0001)
Textiles	–	+	–	+	–	0	–0.390	(0.01)
Knitting mills and clothing	–	–	–	–	+	+	–0.450	(0.0004)
Paper and allied products	+	–	–	–	+	+	0.059	(0.29)
Printing and publishing	+	+	–	–	+	+	0.175	(0.04)
Petroleum and coal products	+	–	–	–	+	+	0.035	(0.37)
Chemicals	+	–	+	–	+	+	0.127	(0.11)
Miscellaneous manufacturing	+	+	0	+	–	–	0.112	(0.08)

1 The regression coefficient of share regressed on a time trend variable.

2 Figures in parentheses are level of significance at which the null hypothesis that the coefficient in the time trend is zero can just be rejected.

SOURCE Based on data contained in Table 2-2.

Table 2-4

Structural Change Indices, Based on Employment in the Manufacturing Sector, Canada, 1951-83

	19-industry sample[1]			118-industry sample[2]	
	1961 base (CI) (1)	1972 base (CI) (2)	Year-to-year (SI) (3)	1961 base (CI) (4)	Year-to-year (SI) (5)
	(Percentage points of total employment transferred)				
1951	5.94	6.29	..	..	..
1952	6.32	6.02	2.23	..	..
1953	6.23	5.98	2.03	..	..
1954	4.00	5.05	2.89	..	..
1955	3.76	4.78	0.94	..	..
1956	4.23	4.06	1.32	..	..
1957	3.92	3.74	1.28	..	..
1958	2.18	4.44	2.31	..	..
1959	1.82	4.61	1.42	..	..
1960	0.87	5.18	1.30	..	..
1961	0.00	5.22	0.87	0.0	0.0
1962	1.34	4.18	1.34	1.9	1.9
1963	1.98	3.70	0.70	3.2	1.7
1964	2.74	3.01	0.96	4.2	1.6
1965	3.86	2.13	1.71	5.8	1.9
1966	4.67	1.42	1.37	6.8	1.9
1967	4.92	1.50	0.94	7.1	2.0
1968	4.67	1.55	0.57	7.5	2.0
1969	5.70	1.40	1.24	8.3	1.6
1970	5.11	1.90	1.41	8.6	2.1
1971	4.82	1.14	0.90	9.1	2.3
1972	5.22	0.00	1.15	9.9	2.4
1973	6.19	1.05	1.05	10.7	2.1
1974	6.35	1.62	1.63	11.3	2.2
1975	6.14	1.97	1.83	11.4	2.2
1976	5.47	1.56	1.63	11.4	2.2
1977	5.27	2.47	1.56	11.7	2.5
1978	5.58	2.78	0.99	12.5	2.2
1979	6.13	3.05	0.69	12.8	2.0
1980	5.80	2.97	1.38	..	..
1981	6.72	3.33	1.12	..	..
1982	6.55	4.99	2.38	..	..
1983	6.22	5.25	1.83	..	..

[1] The level of aggregation is essentially the 1970 two-digit SIC level except that clothing and knitting were combined.

[2] The level of aggregation is based upon that used in the input-output data of Statistics Canada.

SOURCE Economic Council of Canada, CANDIDE database, based on data from Statistics Canada for columns 1 to 3; and Charette et al. (1986), pp. 94-5, for columns 4 and 5.

enough period is chosen for measurement. However, the period required for this to be true may be several decades. Since comparisons of shorter periods are perforce still made, a method of removing the effect of short-run fluctuations is required. Once this is done, the question of whether the pace of structural change has quickened in the recent past can be addressed.

To do so, the dissimilarity indices need to be calculated over "neutral" periods; that is, between years in

Table 2-5

Summary of Decadal Structural Change in the Manufacturing Sector at the Industry Level,[1] Canada, 1951-82

	Average annual change from the dissimilarity index[2] calculated between endpoints (ACI)		Average annual change from the dissimilarity index[2] calculated year-to-year (ASI)
	1961 base	1972 base	
	(Percentage points of total employment transferred)		
1951-61	0.59	...	1.66 (0.21)[3]
1961-71	0.48	...	1.11 (0.11)
1962-72	...	0.42	1.09 (0.11)
1972-81	...	0.36	1.33 (0.12)
1972-82	...	0.50	1.43 (1.15)

1 The two-digit SIC level.
2 See text for definition.
3 Standard error of mean in parentheses.
SOURCE Economic Council of Canada, CANDIDE database, based on data from Statistics Canada.

which the economy was at the same stage in the business cycle. For this purpose, years were chosen for which capacity utilization statistics for the manufacturing sector as a whole were relatively similar. There are two indices of capital utilization available, one from Statistics Canada and one from the Bank of Canada (see Statistics Canada, 1984*b*; Schaefer, 1980). For the Bank of Canada series, years in which capacity utilization statistics of the manufacturing sector were about 90 per cent were chosen; for the Statistics Canada series, years in which they were about 85 per cent were used. The dissimilarity index was then calculated over each period. The periods yielded by each of the capacity utilization series were not identical, but the structural indices derived from each were sufficiently similar that only those using the periods derived from the Statistics Canada capacity utilization series are reported here.

Both the ACI, calculated for the entire period (endpoints), and the ASI, calculated within each period, are reported in Table 2-6. Structural change is examined both in terms of inputs (employment) and outputs (constant 1971 dollar). Although the primary focus of this study is on the extent to which employment opportunities have shifted between sectors, output measures are also presented, since they indicate whether shifts in the allocation of employment are caused just by changes in final demand or are also the result of differences in changes in labour productivity.

The evidence in Table 2-6 once again indicates that the average annual structural change in employment, calculated over similar points on the business cycle, is less than 1 percentage point per year. It is somewhat larger across single cycles (1960-64, 1964-68, 1968-72, 1972-79) than for combinations of these cycles (1960-68, 1968-79, 1960-79). In the latter case, the ACI drops to below 0.5 of a percentage point per year. As was the previous pattern, average annual rates of structural change are lower for longer periods.

There is a considerable difference between the average annual percentage point change derived from the cumulative structural index and the average year-to-year changes even over the shorter cycles. Once again, this shows that short-term cyclical fluctuations are reversed quite quickly.

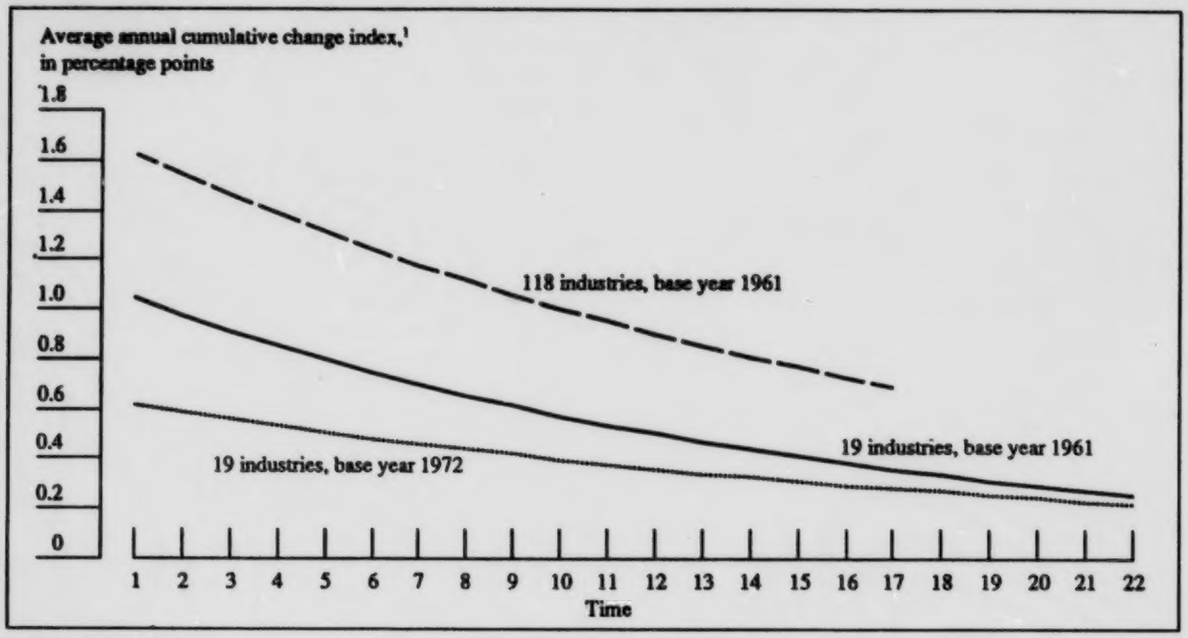
Evidence presented previously showed that structural change for the economy as a whole had fallen in recent years – though the results have to be treated cautiously because no correction was made for cyclical effects. When this is done for the manufacturing sector, both the employment and output cumulative indices have lower annual rates of change after 1968 than before. On the other hand, there is no apparent decline in the average change derived from the sequential year-to-year index. Peculiarities associated with short-term fluctuations that might affect the structural index do not appear to account for the decline in the degree of change depicted by the cumulative structural index.

It is true that, after 1979, the degree of change increased, but this is the result of the severe recession in 1982. The annual year-to-year index using employment (Table 2-4) peaks in 1982 with a change of 2.4 percentage points. The ASI using output is 3 percentage points in 1982 and 5 percentage points in 1983. Picot (1986*a*, p. 39) also found that the distribution of employment was changed dramatically by the recession, but he reports evidence that the recovery has moved the distribution back toward its prerecession shape.

Finally, it should be noted that the measure of change using employment is always less than when using output

Chart 2-2

Average Annual Employment Share Change in All Manufacturing Industries, Canada, Various Periods



1 See text for definition.

SOURCE Economic Council of Canada, CANDIDE database, based on data from Statistics Canada; and Charette et al. (1986), Table 2-11, pp. 94-5.

Table 2-6

Structural Change Indices[1] for the Manufacturing Sector, at the Two-Digit SIC Level, Canada, Selected Periods, 1958-82

	Employment		Output (1971 $)	
	Average annual cumulative change[2] (ACI) (1)	Average annual year-to-year change (ASI) (2)	Average annual cumulative change[2] (ACI) (3)	Average annual year-to-year change (ASI) (4)
		(Percentage points transferred)		
1960-64	0.69	0.97	1.15	1.43
1964-68	0.68	1.15	1.25	1.36
1968-72	0.39	1.17	0.71	1.82
1972-79	0.44	1.34	0.78	1.63
1979-83	0.97	1.69	1.56	3.15
1960-68	0.56	1.06	1.14	1.39
1968-79	0.35	1.28	0.70	1.70
1960-79	0.33	1.19	0.81	1.57
1958-82	0.23	1.26	0.53	1.69

1 See text for definition of indices.

2 Each of the cumulative indices was calculated using the beginning year of each period as the base.

SOURCE Economic Council of Canada, CANDIDE database, based on data from Statistics Canada.

measures. To some extent, this is the result of labour hoarding. The year-to-year index averages are lower for employment (column 2 of Table 2-6) than for output (column 4 of Table 2-6). But the averages over a longer term derived from the cumulative index are also lower for employment than for output. This is not as easily explained by short-term labour hoarding. It is the result of differences in the growth rates of output and in output per worker across industries. Those industries that grew least rapidly are not also those with the poorest record in increasing output per worker.

The change in the structural indices that has been discussed above is the result of differences in the growth rates across sectors. Average annual growth rates in employment for 19 two-digit sectors are reported in Table 2-7. Years of equal capacity utilization in the overall manufacturing sector were once again chosen to minimize the effect of the business cycle. Growth rates were higher in the 1960s than the 1970s. The manufacturing rate of employment growth falls from 3.84 per cent per year in the period 1960-64 to 1.31, 1.20, and 2.12 per cent for the next three periods. Accompanying this is a reduction in the variance of the growth rates. The reduction in structural change that the dissimilarity index demonstrated is not just the result of temporary fluctuations being somewhat smaller for the base years chosen. The reduction in the variance of growth rates in the period prior to the severe 1982 recession confirms that structural change has indeed fallen.[14]

Structural Change and Absolute Decline at the Industry Level

Because of the manner in which the dissimilarity index is calculated, a shift in the relative importance of sectors can occur without an actual decline in any one sector. All sectors may have positive growth rates; yet

Table 2-7

Average Annual Growth Rates[1] of Employment in the Manufacturing Sector, by Industry, Canada, Selected Periods, 1960-79

	1960-64	1964-68	1968-72	1972-79	1960-79	1960-68	1968-79
				(Per cent)			
Wood products	5.18	–1.40	3.59	3.36	2.71	1.84	3.34
Furniture and fixtures	4.56	1.49	2.99	0.92	2.23	3.01	1.66
Primary metals	2.77	1.56	1.25	1.84	1.83	2.16	1.59
Metal fabricating	4.35	2.58	1.49	2.52	2.66	3.46	2.09
Machinery	5.21	3.33	1.54	2.93	3.15	4.27	2.35
Transportation equipment	6.68	3.29	1.63	3.48	3.65	4.97	2.70
Electrical products	4.94	3.65	0.01	0.52	1.98	4.29	0.33
Nonmetallic mineral products	5.31	–1.21	1.69	1.79	1.84	2.00	1.73
Food and beverages	2.42	0.59	0.45	2.02	1.45	1.50	1.41
Tobacco products	0.85	–1.44	–1.34	–0.78	–0.71	–0.30	–0.99
Rubber and plastic products	5.20	3.38	4.80	2.75	3.79	4.29	3.43
Leather	2.24	–1.62	–1.98	–0.41	–0.45	0.29	–0.98
Textiles	4.99	–0.76	1.64	–0.39	1.07	2.08	0.34
Knitting mills and clothing	3.62	–0.82	1.05	0.79	1.09	1.37	0.88
Paper and allied products	2.49	1.31	1.15	2.31	1.87	1.90	1.84
Printing and publishing	1.82	1.94	0.29	3.43	2.05	1.88	2.18
Petroleum and coal products	–0.39	0.57	0.81	5.52	2.07	0.09	3.54
Chemicals and chemical products	1.88	1.94	–0.10	3.46	1.99	1.91	2.05
Miscellaneous manufacturing	6.51	1.44	1.41	1.83	2.01	3.94	1.65
All manufacturing	3.84	1.31	1.20	2.12	2.09	2.57	1.74
Standard error of mean	0.42	0.39	0.34	0.35	0.25	0.33	0.28

1 All rates of change are implicit annual rates calculated from cumulative changes over the period.

SOURCE Economic Council of Canada, CANDIDE database, based on data from Statistics Canada.

differences in growth rates will lead to a change in the relative importance of different sectors. Since the notion of adjustment problems is often associated with absolute decline rather than with just relative share change, the rate of decline in employment levels can also be used to measure the extent of structural change.

The extent to which industries in the 44-industry sample used by Picot (1986*a*) experienced declines in employment levels can be gauged from Table 2-8 where the rates of employment growth over the three decades from 1951 to 1981 are presented.[15] Agriculture is the only industry to decline persistently. Including agriculture, nine industries declined in the 1950s, seven in the 1960s, and only four in the 1970s – once more suggesting less dislocation has been experienced in the 1970s than in previous periods. In the manufacturing sector, average annual changes for declining industries never exceed 3 per cent in any one industry; and the classification of an industry as declining is generally reversed in a subsequent decade.

One of the questions posed for policy purposes is the extent to which specific industries need to be targeted for special adjustment assistance. Apart from the need to do so, there is also the issue as to whether predictions can be made in advance as to which industry will require such assistance. The degree to which industries defined at the two-digit level have changed their status from one of decline to one of growth suggests this is not an easy task. This study goes one step further and asks whether, on the basis of growth rates in one period, predictions could be made about relative growth in a future period. This was done by correlating the rates of growth across Picot's 44-industry sample between decades. For all industries, the correlations were positive and significant for the three decades. For manufacturing, however, they were negative (–0.01) between the 1950s and 1960s, positive (0.18) and not significant between the 1950s and 1970s, and positive (0.58) between the 1960s and 1970s but significant at only the 9 per cent level. Predicting relative performance at this level of aggregation in the manufacturing sector on the basis of past experience is not likely to be a very successful exercise.

The data provided by Charette et al. (1986) can also be used to chart the importance of the amount of employment loss on an annual basis. Employment was calculated annually for a 186-industry economy-wide disaggregation over the period 1962-79. The number of industries that lost jobs, the number of jobs lost, and the percentage of aggregate employment lost are presented for each year in Table 2-9. On average, employment loss in those industries that declined between two successive years is less than 0.94 percentage point of aggregate employment. Some of this will be cyclical. This value, therefore, overstates the structural component of employment decline. On the other hand, the actual percentage of employment in the industries affected will be somewhat larger, since less than 100 per cent of the total number of industries sampled decline in any one year, and the percentage decline reported in Table 2-9 used total employment as the base.

Both problems can be redressed by examining the labour force reduction that occurs only in those industries that declined over a longer period. The employment data presented in Table 2-7 for the manufacturing sector only, at the two-digit level, for subperiods between 1960 and 1979 show that only two industries – tobacco and leather – declined in virtually all subperiods between 1960 and 1979. The annual average rate of decline for both is less than 1 per cent per year. Over short periods, a larger number of industries may decrease in absolute size. The period between 1964 and 1968 has six of 19 sectors declining; but even here, the average rate of decline for all six was only 1.21 per cent per year. Over the period 1960-64, only one industry (petroleum and coal products) declined – at a rate of 0.39 per cent per year.

The rates of employment change presented in Table 2-7 may also be used to examine whether employment growth in one period is a good indicator of subsequent growth. The correlation matrix for employment growth in the 19-industry sample over the periods defined by the capacity utilization statistics is presented in Table 2-10. Growth between adjacent periods is not significantly correlated. Growth rates are related in a slightly more significant fashion between periods once removed from each other. Once again, this suggests a substantial reversal of relative industry fortunes over time, particularly between adjacent periods.

The number of industries that decline over any period will be a function of the level of aggregation. For example, of the 186-industry economy-wide disaggregation sample studied by Charette et al. (1986), employment in 35 industries declined by more than 1 per cent between 1961 and 1979 – compared to just two industries at the two-digit level (Table 2-7). The manufacturing industries that declined are listed in Table 2-11. They are ranked by the absolute growth in their real GDP over the period. Twenty of the 26 suffer employment decline despite substantial growth in output. Both the percentage reduction in total employment by

Table 2-8

Decadal Change in the Experienced Labour Force, by Industry, Canada, 1951-81

	Change in the experienced labour force		
	1951-61	1961-71	1971-81
		(Per cent)	
Agriculture	−22.6	−21.5	−1.6
Forestry	−15.4	−25.8	28.6
Fishing and trapping	−31.3	−26.8	40.7
Mines, quarries, and oil wells	15.1	27.6	43.2
Food and beverages	27.5	16.9	21.4
Tobacco products	5.2	6.4	−9.6
Rubber and plastic products	10.3	89.4	46.4
Leather	5.2	−8.6	8.2
Textiles	−22.5	20.9	13.5
Knitting mills	−16.4	−1.0	14.8
Clothing	4.6	18.0	25.1
Wood products	−12.9	9.4	41.6
Furniture and fixtures	21.6	31.9	47.9
Paper and allied products	13.1	29.6	14.1
Printing and publishing	37.0	30.4	25.9
Primary metals	−28.7	35.7	14.3
Metal fabricating	. .	39.0	34.0
Machinery	. .	63.5	49.4
Transportation equipment	−6.6	45.5	22.5
Electrical products	. .	42.7	11.6
Nonmetallic mineral products	32.7	24.4	20.4
Petroleum, coal, chemicals and chemical products	36.6	18.7	24.9
Miscellaneous manufacturing	22.7	37.7	29.6
Construction	37.8	29.4	33.9
Transportation and storage	10.8	12.3	25.1
Communications	37.2	32.0	45.6
Electric power, gas, and water utilities	26.3	19.4	42.3
Wholesale trade	31.2	23.1	51.7
Retail trade	34.9	40.9	43.8
Financial institutions	62.6	74.6	63.7
Insurance and real estate	58.5	54.6	66.1
Education and related services	78.3	119.4	30.4
Health and welfare	79.1	76.7	56.2
Religious organizations	39.7	4.5	16.4
Amusement and recreation	42.9	101.3	67.2
Services to business management and miscellaneous services	98.5	112.0	105.7
Personal services	21.8	−4.4	−0.4
Accommodation and food services	55.2	52.5	82.2
Federal administration	57.4	21.3	13.5
Provincial administration	87.1	139.7	56.3
Local administration	119.3	28.9	58.9
Other government offices	−1.1	−56.4	−25.9
All industries	22.4	33.3	39.2

SOURCE Picot (1986a), Table B-2, pp. 97-8.

Table 2-9

Absolute Declines in Employment at the Industry Level,[1] Canada, 1962-79

	Number of industries declining	Number of jobs lost	Jobs lost as a percentage of aggregate employment
1962	52	60,569	1.0
1963	54	38,680	0.6
1964	33	37,590	0.6
1965	30	52,038	0.8
1966	32	86,133	1.2
1967	76	66,832	0.9
1968	93	107,756	1.5
1969	63	59,191	0.8
1970	103	135,844	1.8
1971	84	85,217	1.1
1972	56	90,786	1.1
1973	43	55,021	0.7
1974	48	37,494	0.4
1975	92	123,970	1.4
1976	85	106,620	1.2
1977	96	91,309	1.0
1978	56	61,478	0.6
1979	44	22,201	0.2

1 Based on a 186-industry disaggregation.

Source Charette et al. (1986), Table 2-8, p. 84.

industry (column 1) and the implicit annual percentage change (column 2) are presented. While, on average, employment falls by 27.4 per cent between 1961 and 1979 in this sample, the mean of the annualized rates is 1.88 per cent.

Over shorter periods than the 18 years used by Charette et al., more industries might be expected to decline, and their decline to be more severe since the rate of decline may be affected by cyclical fluctuations. In order to investigate this possibility, employment (wage and salary earners) is compared for the 167 four-digit manufacturing industries taken from the Census of manufactures for the years 1970, 1975, and 1979. The results are reported in Table 2-12. The average value of the cumulative dissimilarity index at this level indicates that about 1 percentage point of employment per year was shifted from those losing relative share to those gaining for the five-year intervals and 0.5 of a percentage point over the decade – roughly the result produced by the two-digit aggregation for the period 1972-79 reported in Table 2-6. Some 56 of the 167 industries declined in absolute size between 1970 and 1975, and some 76 between 1975 and 1979. The declining industries in the first period accounted for 33 per cent of total employment as of 1970; in the second period, for 37 per cent of employment in 1975. In the first period, the mean rate of cumulative decline was 12.46 per cent; in the second, 11.18 per cent. This translates to an annual rate of decline of about 2.6 and 2.3 per cent, respectively. Over the entire period, 55 of the industries, accounting for 28 per cent of employment in 1970, declined at an annual rate of 1.96 per cent. Therefore, while the use of both shorter sample periods and finer levels of aggregation increases the rate of decline observed, the effect is relatively minor.

In conclusion, the dissimilarity index shows that long-run structural shifts in employment in the manufacturing sector occur at an annual rate of 1 per cent or less for the levels of aggregation examined here. If just declining industries are examined for the finer levels of disaggregation, the mean decline rate in the 1970s fell between 2 and 3 per cent per year depending upon the time period chosen (Table 2-12).

Interoccupational Shifts

Adjustment problems occur not just because some industries decline relative to others and total employment is reallocated across industries but also because the skills required in growing industries may be quite different than in declining sectors. It may also be that intraindustry changes in skills have led to a mismatch between the demand and supply of labour.

Skill levels are difficult to measure. However, data exist on the occupational classification of the labour

Table 2-10

Correlation Matrix for Employment Growth across 19 Manufacturing Industries,[1] Canada, Selected Periods, 1960-79

	1960-64	1964-68	1968-72	1972-79
1960-64	1.000 (0.000)[2]	0.305 (0.204)	0.575 (0.010)	–0.103 (0.674)
1964-68		1.000 (0.000)	(0.281) (0.244)	0.412 (0.079)
1968-72			1.000 (0.000)	0.353 (0.138)

1 The two-digit SIC level.

2 Figures in parentheses indicate the probability of $\rho > 0$ under the null hypothesis that $\rho = 0$.

Source Based on data contained in Table 2-7.

Table 2-11

Manufacturing Industries in which Employment Declined, Canada, 1961-79

	Cumulative change in industry employment, 1961-79 (1)	Implicit annual change (2)	Cumulative change in industry GDP, 1961-79 (3)
		(Per cent)	
Hosiery mills	–47.4	–3.50	127.2
Asphalt and related products	–21.6	–1.34	121.1
Broom, brush, and mop	–19.4	–1.19	98.1
Dairy factories	–23.4	–1.47	74.8
Radio and TV receivers	–58.8	–4.81	65.3
Tobacco products	–16.0	–0.96	60.0
Fibre preparation mills	–34.1	–2.29	60.0
Clay products	–7.1	–0.41	58.0
Paint and varnish	–10.0	–0.58	50.4
Mixed fertilizers	–34.0	–2.28	39.8
Confectionary	–13.5	–0.80	33.9
Sugar	–11.4	–0.67	24.6
Cotton yarn and cloth	46.6	–3.43	20.0
Thread mills	–15.1	–0.91	20.0
Shoes	–25.9	–1.65	17.4
Leather gloves	–40.0	–2.80	16.7
Flour and breakfast cereals	–11.9	–0.70	14.7
Narrow fabric mills	–16.9	–1.02	12.0
Bakeries	–21.2	–1.31	4.4
Biscuit manufactures	–1.6	–0.09	0.1
Rubber footwear	–43.8	–3.15	–10.5
Wool yarn and cloth	–40.8	–2.87	–10.8
Coffin and casket	–45.7	–3.34	–11.1
Cordage and twine	–40.0	–2.80	–25.0
Cotton and jute	–26.8	–1.72	–25.0
Leather tanneries	–39.0	–2.71	–26.9
Mean	–27.4	–1.88	31.1

SOURCE Charette et al. (1986), pp. 87-8.

force and changes in the share of occupations over time. Providing that the occupational classification scheme catches major differences in skills, examination of the changes in the shares of employment by occupational class will shed light on the degree to which this aspect of adjustment has been important.

Occupational Classification System

The occupational classification system used is that derived from the Canadian Classification and Dictionary of Occupations (CCDO) prepared by the Department of Manpower and Immigration in the early 1970s. This classification system divides occupations into different categories using "kind of work performed" as the underlying principle.[16]

Several levels of occupational classification are provided by the CCDO. The most aggregated level contains 23 categories; the finest contains 498 groups. In what follows, the 23 major-group CCDO classification system is used. The occupational titles adopted here are those used by Foot and Meltz (1985) – see Table 2-13. While the CCDO classification system was originally applied only to data collected for the 1971 and 1981 census, the 1961 census data were recoded to be consistent with the CCDO classification system.[17] Data for all three years are utilized here. The occupational data covers the experienced labour force.[18] The data have been linked to the 1970 SIC so that the occupational breakdown can be performed on an industry basis.

In the analysis of structural change at the industry level presented in the previous section, care was taken to select years at approximately the same point on the business cycle. Occupational data are available only for the census years 1961, 1971, and 1981; the shorter periods chosen previously cannot be used. While the decades for which data on occupational structure are available cover more than one business cycle, the census years have a capacity utilization in the mid-80-per-cent range if the Bank of Canada series is used. Picot (1986*b*, p. 7) also notes the census dates are at roughly the same point on the business cycle.[19] Hence the values of the dissimilarity indices calculated using the decadal occupational structure data should reflect mainly long-term structural change.

Interoccupational Structure and Shifts

Before an examination of the interoccupational shifts for the manufacturing sector is conducted, it is useful to present the occupational structure of the economy as a whole and the manufacturing sector in particular. This is done for the years 1961, 1971, and 1981 in Table 2-13. The manufacturing sector has a larger percentage of blue-collar workers and a lower percentage of white-collar workers than the economy as a whole. While the importance of white-collar workers in manufacturing has gone up (between 1961 and 1971 but not between 1971 and 1981), it has done so less rapidly than in the economy as a whole. In the manufacturing sector, most of the gain for white-collar workers has occurred in the managerial and professional occupations; sales occupations fell in importance during the 1970s.

The cumulative structural change index based on occupations is presented in Table 2-14 for 19 two-digit manufacturing industries, the manufacturing sector, and the economy as a whole using the 23-category occupational grouping. For the manufacturing sector, the values of the index are about the same for each of the two decades – 1961 to 1971 and 1971 to 1981. Over each decade, about 7 percentage points of the experienced labour force shift from declining or slowly growing to more rapidly growing occupations. This is less than 1 percentage point per year. The similarity in the values of the index for each period once more suggests that the pace of structural adjustment – this time measured in terms of occupations as opposed to industries – has not increased in the 1970s. Moreover, there has been a re-

Table 2-12

Cumulative Rates of Decline for Industries[1] in the Manufacturing Sector, Canada, Selected Periods, 1970-79

	1970-75	1975-79	1970-79
Dissimilarity index (CI)[2]	5.84	5.69	5.03
Average cumulative employment growth per industry	10.77 (2.02)[3]	5.03 (1.63)	16.02 (2.64)
Number of industries with declining employment	56	76	55
Percentage declining	33.5	45.5	32.9
Employment (base year) in declining industries as a percentage of total employment	33	37	28
Mean cumulative decline rate for declining industries	–12.46 (1.40)	–11.18 (1.20)	–16.32 (1.90)
Mean cumulative decline rate for those 34 industries which declined in each of the three periods	–12.70 (1.98)	–10.88 (1.62)	21.87 (2.52)

[1] Uses 167 four-digit industries.
[2] See text for definition. The index uses employment.
[3] Standard error of mean in parentheses.
SOURCE Special tabulations provided by Statistics Canada.

Table 2-13

Employment Shares in the Economy and the Manufacturing Sector, by Occupation,[1] Canada, 1961, 1971, and 1981

	Economy			Manufacturing sector		
	1961	1971	1981	1961	1971	1981
	(Per cent)					
Managerial and administrative	3.1	4.9	7.4	2.5	4.1	6.6
Professional occupations	9.8	14.3	16.0	4.1	5.3	5.9
Natural sciences, engineering, and mathematics	2.3	3.0	3.6	3.0	3.8	4.1
Social sciences and related occupations	0.6	1.0	1.6	0.1	0.1	0.1
Religion	0.3	0.3	0.3	0.0	0.0	0.0
Teaching and related occupations	2.8	4.6	4.4	0.0	0.1	0.1
Medicine and health	2.9	4.3	4.7	0.3	0.3	0.4
Artistic, literary, and related occupations	0.9	1.0	1.4	0.7	1.0	1.1
Clerical and related occupations	14.1	17.4	19.0	12.3	13.6	12.5
Sales	10.9	10.5	10.0	6.6	6.5	4.4
Total, white-collar occupations	37.9	47.1	52.5	25.5	29.4	29.3
Services	12.6	12.1	11.9	2.6	2.3	1.9
Transportation equipment operating	4.8	4.2	3.9	2.3	2.2	2.1
Construction trades and other crafts	10.4	8.3	7.6	8.2	6.8	6.3
Construction trades	8.7	7.0	6.4	3.6	3.3	2.8
Other crafts and equipment operating	1.7	1.4	1.3	4.5	3.5	3.5
Production and related occupations	21.2	19.6	18.1	60.1	58.2	59.4
Processing	5.3	4.2	4.0	19.4	16.4	17.7
Machining and related occupations	2.9	3.0	2.7	9.9	10.4	10.1
Product fabrication, assembly, and repair	8.4	8.0	8.0	22.4	20.8	23.3
Material handling and related occupations	2.7	2.5	2.0	4.9	5.4	5.2
Occupations not elsewhere classified	1.8	2.0	1.4	3.4	5.3	3.2
Total, blue-collar occupations	49.0	44.4	41.6	73.1	69.4	69.6
Farming, horticulture, and animal husbandry	10.3	6.8	4.5	0.2	0.2	0.1
Fishing, trapping, and related occupations	0.5	0.3	0.3	0.2	0.2	0.4
Forestry and logging	1.4	0.7	0.6	0.9	0.6	0.5
Mining, quarrying, oil and gas	0.9	0.7	0.6	0.2	0.2	0.2
Total, resource-related occupations	13.1	8.6	6.0	1.1	1.1	1.1
Total, all occupations	100.0	100.0	100.0	100.0	100.0	100.0

[1] Excluding those who replied by not stating their occupation.

SOURCE Foot and Meltz (1985), Table 1, p. 6, for "economy"; and Census of Canada, unpublished tabulations, for "manufacturing."

versal in the changes in occupational structure experienced by manufacturing. The value of the index over the entire 1961-81 period is less than the sum over the two subperiods. For the entire period, it is 7.5 percentage points; the sum, for the two subperiods is 14.0 percentage points. The reason for the reversals can be seen in Table 2-13. In the white-collar sector, clerical jobs increased in importance between 1961 and 1971 but then declined. In the production and related jobs grouping, processing and product fabrication declined in the first decade but then increased in the second. Machining and material handling did the opposite.

The occupational change index for the economy as a whole is also presented in Table 2-14. It is higher than for manufacturing for the 1961-71 period but lower for the 1971-81 period. Hence there is evidence of a slowdown in occupational change at the level of the economy as a whole. Nevertheless, even in the first period, the average annual shift in occupations is less than 1 percentage point per year. In contrast to the manufacturing sector, there is little evidence of reversals between the 1961-71 and 1971-81 periods for the economy as a whole. The change index between 1961-81 (column 3) is not much less than the sum of the indices for the two subperiods.

When the values for the individual manufacturing industry indices are examined, patterns emerge that are similar to those observed for the manufacturing sector as a whole.[20] The sum of the individual indices for 1961-71 and 1971-81 is below the value of the index for 1961-81. Thus, reversals in the structure of occupations also occur at the individual industry level. In the white-collar sector, the managerial group increased in importance for all industries in both 1961-71 and 1971-81. The professional occupations generally suffered no reversals – the exceptions being furniture and fixtures, metal fabricating, and textiles industries. In contrast, the production and related groups of occupations show a reversal between 1961-71 and 1971-81 for all industry groups except machinery, transportation equipment, and petroleum and coal products, which consistently increase their share, and tobacco and chemicals and chemical products, which consistently decrease their share.

There are two significant differences between the individual industry indices and that for the manufacturing sector as a whole. First, the value of the structural change index is almost without exception higher at the individual industry level than for the manufacturing sector as a whole.[21] This implies that there is considerable movement between occupations within different

Table 2-14

Interoccupational Structural Change in the Manufacturing Sector and the Economy, by Industry, Canada, 1961-81

	Structural change dissimilarity index[1]		
	1961-71 (1)	1971-81 (2)	1961-81 (3)
	(Percentage points of total employment transferred)		
Wood products	13.3	6.5	15.8
Furniture and fixtures	13.9	11.6	7.7
Primary metals	13.1	10.5	14.7
Metal fabricating	8.4	7.2	8.9
Machinery	10.6	8.6	15.3
Transportation equipment	9.1	7.7	13.4
Electrical products	8.0	8.7	13.1
Nonmetallic mineral products	12.0	7.2	12.8
Food and beverages	6.8	9.9	10.6
Tobacco products	27.8	11.8	30.9
Rubber and plastic products	16.4	8.9	14.0
Leather	12.9	8.8	6.2
Textiles	18.6	7.1	20.8
Knitting mills and clothing	8.7	6.7	7.2
Paper and allied products	6.5	6.9	7.8
Printing and publishing	9.3	9.1	11.5
Petroleum and coal products	15.6	12.0	22.6
Chemical and chemical products	12.0	9.6	15.6
Miscellaneous merchandise	14.5	9.5	15.4
Manufacturing sector	6.9	7.1	7.5
Economy	9.8	6.1	15.4

1 For definition, see text.
SOURCE Census of Canada, unpublished tabulations.

industries, but that this cancels out at the level of the manufacturing sector. The mean of the individual industry values is still, however, only 0.7 of a percentage point per year for the period 1961-81.

Second, whereas the value of the index for the manufacturing sector as a whole showed little change between the two periods, 1961-71 and 1971-81, this was not the case for the majority of the industries within manufacturing. In all cases except three,[22] the value of the CI fell. The difference is particularly dramatic for wood, tobacco, and textiles, where the value of the CI for 1961-71 was at least twice that of 1971-81. While the degree of structural change has remained constant for the manufacturing sector as a whole, there has been a considerable reduction at the industry level.

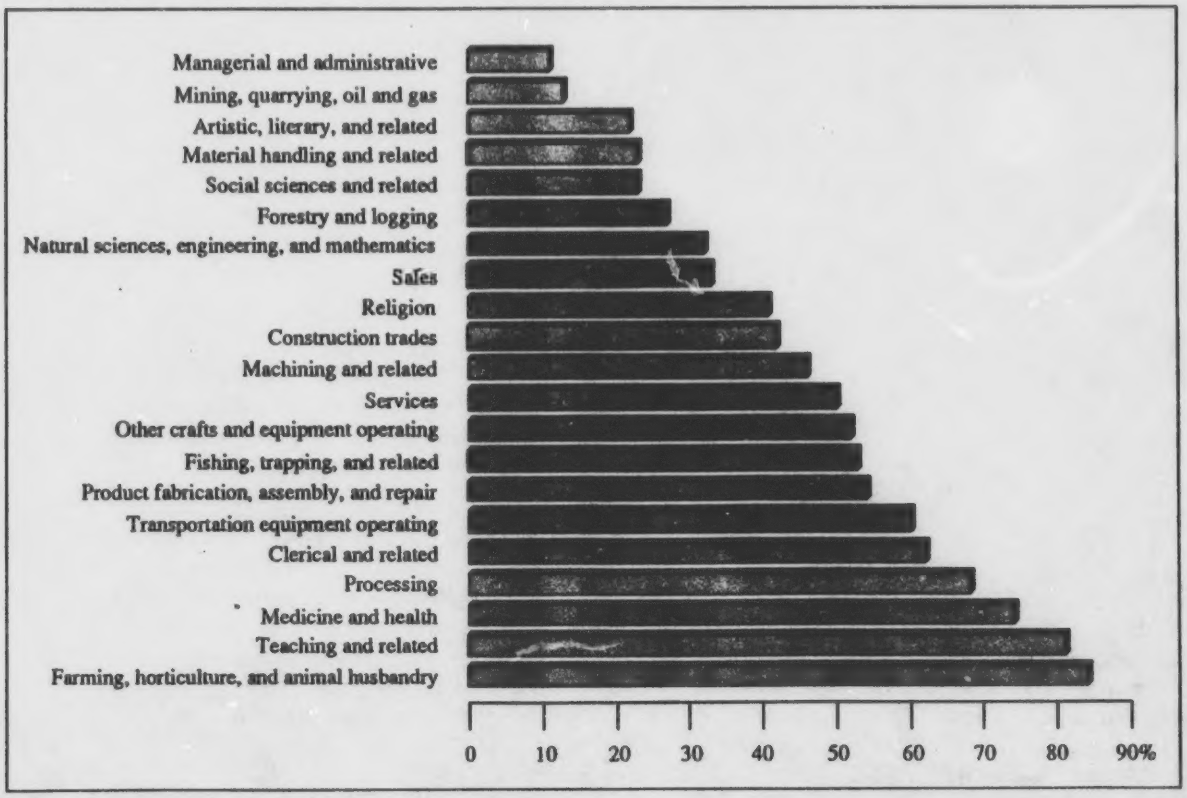
In summary, while structural change in the occupational pattern as measured by the dissimilarity index has occurred in the manufacturing sector as a whole, it amounted to less than 1 per cent per year in each of the two decades. At the two-digit industry level, it has been somewhat greater. But even so, with the exception of tobacco products, it is less than 2 percentage points per year at this level for each decade and less than 1 percentage point over the two decades. Moreover, at both levels there have been considerable reversals over time. Finally, there has been less change at the manufacturing sector level as a whole than in the individual components.

The Relationship between Industry and Occupational Shifts

Structural change has been examined separately for industries and for occupations. Each has been found to involve relatively slow change – usually less than 1 per-

Chart 2-3

Proportion of an Occupation Change in Share of Employment Attributed to a Change in the Industrial Mix, 21 Two-Digit Occupations, 23 Economy-Wide Industry Groups, Canada, 1971-81



Source Picot (1986*b*), Chart 2, n.p., based on Table 4, n.p.

centage point per year. The relationship between the two, however, needs a brief comment because they may not be independent of one another.

Picot (1986*b*) examined the extent to which the changing mix of employment has affected the occupational structure between 1971 and 1981. Using 21 two-digit occupations and 23 industry groups, Picot calculated the percentage of an occupation's change in share of employment that can be attributed to a change in the industrial mix. Chart 2-3, taken from Picot, presents these proportions by occupational category. On average, about 45 per cent of the change in an occupation's share is accounted for by a shift in the importance of employment in different industries.[23]

While Picot's study suggests there is substantial change in occupational structure that is independent of demand shifts, it does not indicate whether occupational change and industry decline are related. If those industries that are declining are also those experiencing the greatest occupational change, workers in these industries suffer from a two-edged sword. To answer this question, the occupational structural change indices calculated for the 19 two-digit industries for the periods 1961-71, 1971-81, and 1961-81 were correlated with the employment-growth rates reported in Table 2-7.[24] The correlations were negative but not significant. To investigate this further, the means of the occupational structural change indices were calculated for each period for those industries above and below the mean industry growth rate. For the period 1961-71, the means were 11.56 and 13.05 percentage points, respectively; for 1971-81, they were 8.37 and 9.39 percentage points, respectively; and for 1961-81, they were 13.83 and 13.94 percentage points, respectively. These differences in means were not significant at the conventional level of 5 per cent. Thus slowly growing industries had slightly more occupational change, but the difference was not significant.

Conclusion

This chapter examined the extent to which change has led to a shift in the importance of different sectors, industries, and occupations. Long time periods in the post-Second World War era were used. These intervals were characterized by both rapid and slow growth. Two different but complementary approaches were used to generate summary measures of change. The first focused on relative employment shares and changes therein over time. The second examined just those industries that suffered an absolute decline in employment. Summary statistics that captured the degree of change in both share of employment and absolute levels of employment were derived. Differences between change measured in the short and long run, and at different levels of industry aggregation, were examined.

Four conclusions emerge from this chapter.

First, despite the myriad of influences that determine the structure of labour usage, the shifts in employment that have taken place across industries, while large in a cumulative sense, are much less so when measured on an annual basis. This conclusion is generally independent of the summary statistics that were used and, to a large extent, the level of industry classification. Whether measured by the dissimilarity index or the rate of job loss only in those industries that actually declined, the labour that is "reallocated" annually (either industry by industry or occupation by occupation) rarely amounts to more than 2 percentage points and generally is below 1 percentage point.

Second, much of the change observed over year-to-year periods is cyclical in that it is reversed within a very short time period. The longer-term structural change is always less than the short-run change. Furthermore, patterns of short-term change appear to be independent of the longer-run movements.

Third, the dissimilarity indices, when calculated over similar periods in the business cycle, and the data on variances in growth rates all suggest that structural change has lessened over the 1970s compared to the two earlier decades.

Fourth, the data suggest that the manufacturing sector does not have a significantly higher degree of structural change than the economy as a whole – whether at the industry or occupational level. Change appears to be no more important here than elsewhere.

This chapter has set the stage by providing an overall picture of the degree of structural change in the Canadian economy and in the manufacturing sector in particular. Attention now turns from the macro perspective to that of individual microeconomic agents – workers and firms. This provides a different perspective on change and suggests that the 1 per cent per year shifting in employment masks or conceals a considerably greater underlying change or churning within industries.

3 Job Turnover in Canada's Manufacturing Sector

Change in the Canadian economy constantly transfers resources from one use to another. Chapter 2 examined the extent to which differences in industry growth rates caused shifts in the relative importance of broad sectors of the economy and individual industries within the manufacturing sector. This chapter investigates the degree to which employment is reallocated between producing units in the Canadian manufacturing sector because some firms grow while others decline. The associated reallocation of employment is the result of both interindustry and intraindustry shifts in relative firm size.

In the broader context, firms decline or leave an industry because of management mistakes, better returns in another type of business, or changing market conditions. Employment fluctuates in response to these changes in firm fortunes through the creation of jobs and the loss of existing ones. Job growth may originate from the creation of an establishment or the expansion of existing ones; job loss, from the closure of an establishment or the decline of existing ones. Firms may also grow and decline as the result of mergers, although in this instance jobs are transferred from one firm to another.

If reallocation between producers occurred only because of interindustry resource reallocation, the firm-based measures reported in this chapter would take on similar values to those derived previously. But resources can also be shifted between producers because of a change in relative position of firms or establishments within an industry. Competition within an industry leads some firms to grow and others to decline. This latter effect is not captured by studies that focus on changes at the industry level. Change, when measured using producer employment levels, should therefore be larger than at the industry level.

This chapter focuses on the amount of firm-initiated employment change. It does so by measuring producer employment at two points in time. The difference is the number of jobs or positions that have been gained or lost as the result of producer growth and decline. These are the employment changes that are forced on workers directly because of the rise and fall of producers. In calculating measures of this change, this chapter focuses on two issues. The first is the size of the adjustment that the economy has absorbed in the past. By doing so, it provides a benchmark against which anticipated changes arising in the future, such as from further trade liberalization, can be evaluated. The second is whether there is a pattern to the adjustment process. The questions posed in Chapter 1 are further examined here. Is there a normal or usual rate of job turnover? Typically, does adjustment come primarily on the contraction (job loss) or the expansion (job gain) side? How does the division between these two change during periods of recession? What is the difference between the amount of adjustment that occurs as a result of entry and exit as opposed to growth and decline in the continuing segment? How does the process differ in the short run as opposed to the long run?

During the past decade, adjustment has been required of the Canadian economy for a number of reasons. Reductions in tariffs, increasing competition from newly industrialized countries, the energy crisis, a major change in the value of the Canadian dollar, the collapse of commodity prices, and the recession of 1981-82, all have required firms to respond in a variety of ways. The future is never quite the same as the past. Nevertheless, if some patterns of adjustment are found to be relatively stable, they may be used to predict the type of adjustment patterns and problems that will emerge.

Job Turnover: Previous Work

In an earlier study (Baldwin and Gorecki, 1983), the importance of firm and establishment entry and exit in the manufacturing sector in the 1970s was examined. The status of all establishments in the years 1970 and 1979 was compared in order to measure entry and exit over the decade. Although this study did not focus on job turnover, the underlying data from which it was derived can be used to shed light on this issue. While not intended to measure annual rates of change because of its long-term focus, the study nevertheless sheds light on the cumulative effects of entry and exit over a decade. Because of its comprehensive nature, it also places both the firm and the establishment entry and exit process in the context of other changes that were taking place.

Methodology

In the Baldwin and Gorecki (1983) study, establishments are classified as births (existing in 1979 but not in 1970), exits (existing in 1970 but closed by 1979), or acquired, divested, or continuing (existing in both 1970 and 1979).[1] Establishments are then aggregated into firms. A firm consists of all establishments at the four-digit SIC industry level under common control. This classification, in turn, allows firms to be grouped into new firms, exiting firms, and continuing firms on the basis of the status of their establishments. New firms are broken down into two groups: those that acquired an existing establishment[2] and those that created an establishment.[3] Exiting firms are divided into those that divested themselves of an establishment[4] and those that closed an establishment.[5] Finally, the establishments of continuing firms are broken down into those that are new, closed, or existed in both 1970 and 1979. This latter category was further divided into those establishments that experienced ownership changes – divested or acquired – and those that did not.

Because of the classification scheme used, the establishment-creation and -destruction process for continuing firms can be compared to that for the entering and exiting segment. Similarly, the merger process for continuing firms (horizontal) can be contrasted to that which brings new firms into an industry (diversified mergers). This is done in Table 3-1. The importance of each category is measured first by the proportion of firms engaged in it and, second, by the relative proportion of the new, acquired, divested, and closed establishments' shares of industry employment.[6] The num-

Table 3-1

Average Share of Number of Firms and of Employment across 141 Manufacturing Industries[1] for Various Categories of Entry and Exit, Canada, 1970 and 1979

	Share of number of firms		Share of employment	
	1970	1979	1970	1979
		(Per cent)		
Firm category:				
All firms	100.0	100.0	100.0	100.0
All entrants[2]	–	32.5	–	29.3
Entry by birth	–	27.4	–	16.5
Entry by acquisition	–	5.9	–	12.8
All exits[3]	42.9	–	32.3	–
Exit by divestiture	7.5	–	14.6	–
Exit by closure	36.3	–	17.7	–
All continuing firms[4]	57.1	67.4	67.7	70.7
With continuing establishments	56.5	66.8	62.2	63.1
With divestiture	0.6	–	1.1	–
With acquisition	–	2.1	–	3.2
With establishment birth	–	3.9	–	4.4
With establishment closure	3.1	–	4.4	–

1 The sample corresponds to the 167 four-digit SIC industries for which data existed in both 1970 and 1979 less those industries classified as miscellaneous, or 141 industries in total.

2 Firms that entered between 1970 and 1979 by establishment birth and/or acquisition. A firm may enter an industry by both methods so the sum of the subcategories may be greater than the total.

3 Firms that exited between 1970 and 1979 by establishment divestiture and/or closing. A firm may exit an industry by both methods so the sum of the subcategories may be greater than the total.

4 Firms that existed in both 1970 and 1979. As above, a continuing firm may fall into more than one category. The shares of employment for the bottom four subcategories refer to the establishments of continuing firms that fall into these categories.

SOURCE Special tabulations provided by Statistics Canada.

bers and percentages cited below are the mean levels across the 141 four-digit industries[7] in the manufacturing sector for which data are presented in Table 3-1.

Entry, Exit, and Job Turnover

Several features of the entry and exit data presented in Table 3-1 are salient for understanding the process of job turnover. First, the cumulative effect of entry and exit over the decade is large. Firms that entered the industry since 1970 accounted for, on average, 33 per cent of all firms and 29 per cent of employment in 1979. Firm exits over the decade accounted for, on average, 43 per cent of the number of firms and 32 per cent of employment in 1970.

Second, a large portion of firm entry and exit involved establishment births or deaths. If the number of firms is used, the entry process is dominated by establishment creation. In 1979, 27.4 per cent of enterprises were entrants since 1970 via establishment birth. Only 5.9 per cent were entrants via merger. In contrast, when employment is used, entry by establishment creation and entry by diversified merger are more equally split – accounting for some 16.5 and 12.8 per cent of employment in 1979, respectively. The difference in importance, using employment as compared to numbers, is the result of two factors. Establishments created by new firms averaged 53.5 employees, while establishments acquired by firms new to an industry had 156.6 employees (Baldwin and Gorecki, 1983, Table 5, p. 19). Moreover, the former enterprises rarely built more than one establishment; the latter acquired, on average, 1.5 establishment per firm (ibid., Table 3, p. 15).

A third finding is that the importance of the firm-exit processes (divestiture versus establishment closure) differs, depending upon whether it is measured by the share of the number of firms or the share of employment. In terms of numbers, exit via establishment closure was more important. In terms of percentage of employment, exits via closure and divestiture were about equally important. On average, smaller firms tended to die via closure, while larger firms were divested to other firms.

Fourth, the study shows that the entry-by-birth and exit-by-closure categories were much more important than the same categories for continuing firms. For example, the new establishments of continuing firms accounted for only 4.4 per cent of employment in 1979, while the new establishments of entering firms accounted for 16.5 per cent. Diversified mergers were also more important than horizontal mergers. The employment share of establishments acquired by firms in the same industry was, on average, 3.2 per cent as of 1979, but it was 12.8 per cent for establishments acquired by firms outside the industry.

Together, these data show substantial turnover took place in jobs at the establishment level during the decade. They also illustrate the need for careful distinctions to be made when measuring this phenomenon. Not all firm entry involves establishment creation. Establishment creation occurs predominantly, but not exclusively, in the entering segment. Finally, horizontal mergers alone do not catch the extent to which jobs are transferred from one economic entity to another. For this phenomenon to be measured accurately, data on diversified mergers are needed as well.

No matter which concept is used to estimate job turnover associated with entry and exit, the data indicate that it was substantial. If establishment exits are used, they encompassed, on average, 22.1 per cent of industry employment in 1970 for both exiting and continuing firms. Establishments that were new over the decade accounted for 20.9 per cent of employment in 1979. On average, a further 15.7 per cent of industry employment in 1970 was in establishments that were divested, while 16.0 per cent in 1979 was in establishments that were acquired by new owners during the decade. Thus, 37.8 per cent of employment in 1970 was in establishments that either exited or were divested; 36.9 per cent in 1979 was in establishments that were either newly opened or acquired.

Since entry and exit are so important, the characteristics of the establishments that enter and exit were examined. Size, diversity, productivity, and profitability were chosen. For 1979, new establishments of both new firms and continuing firms were compared one to another and to an industry norm – the continuing establishments of continuing firms. Similarly, for 1970, exiting establishments of both exiting firms and continuing firms were compared to one another and to the continuing establishments of continuing firms. The means of the relative characteristics are presented in Table 3-2.

The new establishments of new firms were generally smaller and more specialized than both the new and continuing establishments of the continuing firms segment. But they did not suffer a disadvantage with

Table 3-2

Means of Relative Establishment Characteristics for Entering, Exiting, and Continuing Firms across 141 Manufacturing Industries,[1] Canada, 1970 and 1979

	Shipments	Productivity[2]	Profitability[3]	Diversity[4]
		(Ratio)		
Establishment comparison:				
New establishments of new firms/continuing establishments of continuing firms (1979)	0.61[5]	1.05	1.14[5]	1.15[5]
	(0.05)	(0.04)	(0.05)	(0.03)
New establishments of continuing firms/ continuing establishments of continuing firms (1979)	0.97	1.12[6]	1.08	1.08[5]
	(0.07)	(0.08)	(0.07)	(0.03)
New establishments of new firms/new establishments of continuing firms (1979)	0.72[5]	0.98	0.96	1.15[5]
	(0.07)	(0.08)	(0.16)	(0.05)
Closed establishments of exiting firms/ continuing establishments of continuing firms (1970)	0.54[5]	0.81[5]	0.91[7]	1.07[5]
	(0.06)	(0.03)	(0.05)	(0.03)
Closed establishments of continuing firms/ continuing establishments of continuing firms (1970)	1.10	0.98	0.93	1.06
	(0.11)	(0.04)	(0.07)	(0.04)
Closed establishments of exiting firms/closed establishments of continuing firms (1970)	1.06	0.98	1.26	1.09[7]
	(0.20)	(0.05)	(0.20)	(0.05)

[1] While the relative establishment characteristics were calculated for all 141 industries (the 167 four-digit SIC industries less those classified as miscellaneous), the means were calculated only for the subset where nonzero observations existed. See Baldwin and Gorecki (1983) for a discussion of the coverage in each category.

[2] Productivity is defined as census value added per employee.

[3] Profitability is manufacturing value added, minus wages, divided by value of sales.

[4] Diversity is defined as the Herfindahl of the shares of each product produced per establishment where products are defined at the four-digit ICC level.

[5] Standard error of mean in brackets significantly different from 1 at the 0.005 per cent level.

[6] Standard error of mean in brackets significantly different from 1 at the 0.01 per cent level.

[7] Standard error of mean in brackets significantly different from 1 at the 0.05 per cent level.

SOURCE Special tabulations provided by Statistics Canada.

regards to either productivity or profitability vis-à-vis their compatriots. Indeed, they were more profitable than continuing establishments of continuing firms. Establishments that were closed by exiting firms were smaller, less profitable, and less productive than the continuing establishments of continuing firms.

The implications of this are important. Establishment closure is a result of failure, as the evidence on productivity and profitability suggests. Moreover, while births via establishment creation by new firms may suffer a size disadvantage, this does not relegate them to failure. Those that survived until 1979 managed a profitability and productivity record at least equal to that of the continuing establishments of existing firms. The death and birth process reallocates resources from the less to the more successful.

Adjustment Processes

There is still the question of how the birth and death process reallocates resources across industries in response to differential growth conditions. If exit rates are much higher in slow-growth industries than faster-growing industries, but birth rates remain relatively constant, then adjustment comes from increasing the rate at which workers are forced to seek new jobs. If, on the other hand, exit rates are relatively constant and birth rates more variable, the adjustment process requires that workers who would normally be seeking jobs because of producer failure do so in industries where there are more new opportunities.

The data on entry and exit between 1970 and 1979 suggest the second characterization of the adjustment process is more appropriate. Entry rates respond more than exit rates to differential growth opportunities. Table 3-3 reports the average entry and exit rates (calculated as a percentage of the number of firms and of industry sales in 1970) for industries grouped into four categories – those experiencing negative, slow,

Table 3-3

Average Firm Entry and Exit Rates by Industry Growth Rate in 141 Manufacturing Industries,[1] Canada, 1970 and 1979

	Industry growth rate[2]				Canadian average
	Declining	Slow	Moderate	Fast	
			(Per cent)		
Entry/exit indicator:					
As a percentage of the number of firms per industry in 1970[3]					
Entry[4]	26.6	31.9	35.9	46.5	36.1
Via birth	19.0	25.0	27.9	37.1	28.1
Via acquisition	7.9	7.3	9.8	11.3	9.2
Exit[4]	47.1	40.4	40.8	42.3	42.3
Via closure	38.4	31.3	29.5	31.4	32.2
Via divestiture	10.2	9.8	13.7	12.2	11.6
As a percentage of industry value of shipments, 1970					
Entry[4]	25.8	26.9	37.3	62.0	39.5
Via birth	12.3	16.2	17.9	36.0	21.6
Via acquisition	13.5	10.7	19.3	26.0	18.0
Exit[4]	40.7	28.0	28.7	28.6	30.7
Via closure	23.9	16.5	11.6	15.4	16.2
Via divestiture	16.8	11.6	17.1	13.2	14.5
			(Number)		
Number of industries	26	36	39	40	141
Average number of firms per industry					
1970	53.7	98.3	69.2	119.7	88.1
1979	44.8	79.1	60.4	103.7	74.6
Average number of employees per industry					
1970	5,442	9,378	11,683	8,127	8,935
1979	4,744	9,238	13,222	10,528	9,874

[1] Encompasses the 167 four-digit Canadian manufacturing industries using the 1970 SIC, less those of a miscellaneous nature.

[2] Growth rates are for industry shipments using 1970 and 1979. Annual growth rates for the four categories are as follows: declining, –2 to 0; slow, 0 to 2; moderate, 2 to 4; and fast, 4+.

[3] If entry rates are calculated with 1979 as the base year, the conclusion still holds that entry rates increase as industry growth rate increases.

[4] As in Table 3-1, the sum of the subcategories may be greater than the total because a firm may enter or exit in more than one fashion.

SOURCE Baldwin and Gorecki (1983), Table 9, p. 30.

moderate, and fast real growth. If the differences in entry rates across the four categories are compared, entry rates can be seen to respond monotonically to growth. This is not the case with exit rates. While exit rates are higher for declining industries, they are relatively constant for the different classes where positive growth occurs. The exit rate, as a percentage of number of firms in 1970, is 47 per cent in declining industries but above 40 per cent in growing industries.

This has important implications for any study that measures the costs of adaptation. Exit is a manifestation of failure. The data from Table 3-3 suggest the probability of failure that is unrelated to growth is relatively high when accumulated over a decade. These failures can be referred to as "normal" or "typical" in the sense that the proportion of total resources involved does not vary much in response to changing economic conditions – as long as the changes in macroconditions are not too severe. Adaptation occurs on the entry side; that is, there is less entry than exit in declining industries and more in growing industries.

The data in Table 3-3 also show that one form of adjustment – that which is associated with absolute decline in an industry – does not all come from an increase in exits. In the slow-growth class, the impact of entry and exit on sales just about balances out. In the declining industries, there is a cumulative net effect of entry minus exit of about –12 per cent on 1970 sales. Entry via establishment birth added 12.3 per cent in 1970 sales; exits via establishment closure led to a loss in sales equal to 23.9 per cent in 1970. The net decline of employment in the declining sector relative to the slow-growth class was brought about by both a decline in entry and an increase in exits in the declining, relative to the slow-growth, sector. About 4 of the 11 percentage points of the net sales loss in the declining category, relative to the slow-growth category, result from a decline in births, and about 7 from an increase in exits.[8]

Job Turnover: New Work

In the previous section, only one source of job creation and destruction – the entry and exit process – was dealt with. Job turnover will also occur as some continuing producers contract and others expand. A comprehensive examination of total job turnover requires information on both processes. The Baldwin and Gorecki (1983) study adopted a relatively long time frame for its reference. By focusing on the cumulative effects of entry and exit over a decade, it does not trace the short-run profile of changes that produced the long-term result. There is no inherent reason why the annual changes, when cumulated, must necessarily equal the long-term result. Therefore, long-term changes may be poor indicators of the amount of change in labour markets that occurs on a year-to-year basis because of producer growth and decline. In the remainder of this chapter, both deficiencies are rectified.

Methodology

The components of producer-initiated job or employment change may be measured by focusing on changes in either establishment or firm employment. An establishment is generally an individual production unit.[9] A firm is an entity that may comprise one or more establishments.[10] Measuring change with establishment, as opposed to firm, data yields inherently different information.

Change at the firm level can occur because new firms enter by building a new establishment or by acquiring an existing establishment; existing firms may expand or contract an existing establishment, build or close an establishment, and acquire or divest an establishment. Mergers affect firm size but do not initially involve the creation or destruction of jobs. Therefore, change, when measured at the firm level, will not be the same as when it is measured at the establishment level (where the ownership of the unit is not considered).

If the establishment level is chosen as the unit of analysis, then entry is defined as the creation of an establishment, and death as the closure of an existing establishment. Part of the employment impact in each case will be the result of firms that enter and exit from an industry by opening and closing establishments;[11] part occurs as continuing firms open and close establishments. When continuing establishments are used to examine the rate of growth and decline, the population consists of establishments that continue irrespective of whether or not there has been a change in ownership due to acquisition or divestiture. If the focus of a study is on producer-initiated changes in jobs, establishment data yield this information. For this reason, this section concentrates first on change at the establishment level.

To develop establishment and firm-related measures of job change, the Census of Manufactures is used to track the history of firms and their establishments on a year-to-year basis from 1970 to the early 1980s. Two separate, though related, economic entities are considered: the establishment and the firm.[12] The firm in this section is defined as all manufacturing establishments under common control, not just those in a particular manufacturing industry, as was the case in the Baldwin and Gorecki (1983) study.[13] However, the concept of the establishment does not differ between the previous and the new work.

Each establishment classified to the manufacturing sector is required to complete an Annual Census of Manufactures questionnaire. The birth (or entry) of an establishment in the manufacturing sector is dated by the year in which it first completes a form, and the exit or death of an establishment by the last year in which it completes such a questionnaire.[14] A somewhat similar definition is used for entry and exit of a firm.[15]

As noted, two databases were created: one using establishments and the other using firms. Establishments can enter and exit the manufacturing universe, even though the firm that owns the establishments continues to exist. Hence, the establishment base and the firm base can be used to answer different questions. The establishment base covers all establishment openings and closures for both continuing, new, and exiting firms. It measures the extent to which producer-initiated changes in employment are important. The firm base provides an opportunity to focus on new and exiting firms and to distinguish between establishment openings and closures, as opposed to acquisitions and divestitures. It provides information on whether job growth comes from entering or existing firms.

Employment changes at the establishment and firm level may be calculated either by comparing the status of establishments between two adjacent years or between two years that are further apart. The first measures short-run change; the second captures long-run change. Long-run change may be quite different from short-run change, even when the former is corrected for the longer period covered. This will occur if an establishment or firm that continues over the longer period of comparison expands in one year and contracts in the next, but experiences little net change over the entire period. It will also occur if most entrants exit almost immediately.

Estimates of longer-run change more closely reflect structural adjustment within an industry. They net out short-run changes, especially in the continuing segment, that are the result of cyclical fluctuations that tend to be reversed in the longer run. On the other hand, they may not be reflective of the actual amount of labour turnover that is the result of changing producer fortunes. Short-run fluctuations in output and employment will better measure this phenomenon if the associated annual layoffs move to other employers during temporary year-to-year declines in employment at the establishment level. Therefore, the components of employment change are calculated here both on a yearly basis (referred to as the short run) and for longer periods.

Job Turnover at the Establishment Level: Short Run

Establishment Entry and Exit

The importance of establishment openings and closures using the establishment database is presented in Table 3-4, which tabulates rates of change of establishment numbers and of employment affected for the years 1970-81. On average, 5.4 per cent of the sample of

Table 3-4

Annual Establishment Entry and Exit Rates in the Manufacturing Sector,[1] Canada, 1970-81

	Employment affected[2]		Number of establishments[2]	
	Entry[3] (1)	Exit[4] (2)	Entry[3] (3)	Exit[4] (4)
	(Per cent)			
1970-71	2.12	1.80	2.31	4.91
1971-72	1.84	1.96	4.44	5.43
1972-73	1.80	1.59	4.67	4.40
1973-74	2.12	1.77	5.30	5.99
1974-75	2.13	1.88	6.52	5.29
1975-76	1.14	2.45	3.75	5.55
1976-77	0.90	2.09	2.22	5.45
1977-78	1.49	1.86	4.10	4.29
1978-79	1.14	1.42	3.46	4.53
1979-80	1.77	1.90	5.00	5.40
1980-81	1.27	2.61	3.42	7.97
Mean	1.61	1.94	4.11	5.38

1 The manufacturing sector is defined using the 1970 SIC between 1970 and 1981. See Appendix B for more details on the calculations contained therein.

2 All rates are calculated as percentages of employment or establishments in the base year.

3 Entry is defined as occurring in the year the establishment first filed an Annual Census of Manufactures questionnaire.

4 Exit is defined as occurring in the year the establishment last filed an Annual Census of Manufactures questionnaire.

SOURCE Special tabulations provided by Statistics Canada.

establishments exit annually; entrants add 4.1 per cent to the number of establishments annually. Because exiting establishments are somewhat smaller than the average, the annual rate of job loss due to exits is lower than the establishment closure rate – with a mean annual rate of 1.9 per cent. While the average annual chance of an establishment closing is 1 in 20, the probability of a job being in an establishment that closes is only 1 in 50. Similarly, entering establishments are also smaller than the average, since new establishments account for some 1.6 per cent of employment, on average.

Earlier, it was noted that exit rates over a decade, when calculated across a cross-section of industries, were remarkably stable – except when industries declined in absolute terms. Entry rates tended to respond more than exit rates to changes in industry growth rates – at least for those industries where positive growth occurred. However, where growth was negative, exit rates did increase.

One might then expect to see greater volatility in the yearly entry than in the exit rates, but only when growth is positive. This is the case. The variance of the entry rates is greater than that of exit rates for the period 1971-80. The difference is not significant when the recessions years after 1980 are included; however, in the more normal period prior to 1981, the differences are more significant.[16] Despite the inherently greater variability in the annual entry and exit data due to measurement error, the earlier conclusions are verified by the annual data.

Continuing Establishment Growth and Decline

Entry and exit account for only part of producer-initiated job change. The other portion originates from

Table 3-5

Annual Rate of Change in Employment[1] in the Manufacturing Sector, by Type of Establishment, Canada, 1970-81

	Continuing establishments[2]				New[3] and exiting[4] establishments	
	Growing (1)	Declining (2)	Net change[5] (3)	Turnover[6] (4)	Net change[7] (5)	Turnover[8] (6)
			(Per cent)			
1970-71	6.6	6.8	–0.2	13.4	0.32	3.9
1971-72	8.6	4.7	3.9	13.3	–0.12	3.8
1972-73	9.6	4.3	5.3	13.9	0.21	3.4
1973-74	7.8	5.8	2.0	13.6	0.35	3.9
1974-75	6.5	9.8	–3.3	16.3	0.25	4.0
1975-76	7.7	7.1	0.5	14.8	–1.31	3.6
1976-77	6.5	7.0	–0.4	13.5	–1.19	3.0
1977-78	8.3	5.7	2.6	14.0	–0.37	3.4
1978-79	8.8	5.7	3.0	14.5	–0.28	2.6
1979-80	6.6	7.8	–1.2	14.4	–0.13	3.7
1980-81	6.7	6.6	0.1	13.3	–1.34	3.9
Mean	7.6	6.5	1.1	14.1	–0.33	3.6
Standard error of mean	0.33	0.46	...	...	...	...

1 All rates are calculated as percentages of employment in the base year.
2 Continuing establishments existed in both years (e.g., in 1970 and 1971).
3 New establishments existed in the latter year but not the former (e.g., for 1970-71, they existed in 1971 but not 1970).
4 Exiting establishments existed in the former year but not the latter (e.g., for 1970-71, they existed in 1970 but not in 1971).
5 Column 3 = column 1 – column 2.
6 Column 4 = column 1 + column 2.
7 Column 5 = column 1 – column 2 of Table 3-4.
8 Column 6 = column 1 + column 2 of Table 3-4.
SOURCE Special tabulations provided by Statistics Canada.

the growth and decline of continuing establishments. In order to estimate the importance of the contribution that this segment makes to turnover, establishments were compared in successive years from 1970 to 1981. For each year, they were divided into those that grew, declined, or remained constant. Then the change in employment in each of the growing and declining sectors relative to total manufacturing employment in the previous year was used to measure growth and decline rates. These are presented in Table 3-5. For the purpose of comparison, summary establishment statistics for the change associated with entry and exit are also presented.

The amount of underlying change in jobs within continuing establishments in the manufacturing sector is considerably larger than net year-to-year employment change would indicate. On average, net growth in continuing establishments between 1970 and 1981 was about 1 per cent per year. But this was accompanied by a 6.5 per cent average annual contraction rate from job loss in continuing but declining establishments, and a 7.6 per cent average annual expansion rate from job gain in employment in growing establishments.

A measure of the churning in jobs that occurs because of the rise and fall of establishments is the sum of the employment growth and decline rates. It will be referred to here as the turnover rate. If it is assumed that the only workers to change positions are those who lose a position, and those who leave a job in a declining establishment do not overlap with those who gain a job in a growing establishment, the turnover rate measures the proportion of the work force that is affected by the growth and decline of establishments.

The turnover rate for the continuing sector (column 4) was large relative to its employment change. An average net change in the continuing sector of 1 per cent of total employment was accompanied by a labour-turnover rate of 14 per cent. Turnover was also large relative to net change in the entering and exiting segment. Net annual employment growth in that segment was –0.3 per cent, on average. Annual employment loss associated with exiting establishments was 1.9 per cent of total manufacturing employment, on average; employment gain associated with entering establishments was 1.6 per cent of total employment, on average. Turnover in this segment was 3.5 per cent. Together, total or gross job loss in declining but continuing establishments and exiting establishments averaged 8.4 per cent per year over the period; total or gross job gain averaged 9.2 per cent per year. Total or gross turnover was 17.6 per cent annually.

A Comparison of Job Turnover from Entry and Exit with Growth and Decline

The data in Tables 3-4 and 3-5 shed light on the importance of employment changes associated with establishment entry and exit relative to employment changes connected with the expansion and contraction of existing or continuing establishments. Exit potentially involves higher adjustment costs because a complete unit is closed down, while contraction of existing units is likely to involve adaptation at the margin. Establishment closure is more likely to affect workers within a wide range of ages, seniority, and firm-specific capital than establishment decline, especially if the latter involves relatively few individuals. Most of the job loss, when measured on an annual basis, comes from the continuing sector (Table 3-5, column 2, versus Table 3-4, column 2). The mean employment exit rate for the 1970-81 period is only 23 per cent of the mean total job-loss rate caused by exits plus declining but continuing establishments.

Adjustment Processes

Exit and decline are manifestations of producer failure. Some instances of failure will be the result of ineptness; others will be the result of misfortune. That part which is generally unrelated to economic conditions, except in the worst of circumstances, can be regarded as the "normal" rate of decline that continuously reallocates resources. The resources that are released as a result of this normal ongoing decline impose a cost that is an inherent part of a market economy that rewards success and penalizes failure. In the 1970s, this was equal to the 8.4 per cent gross job-loss rate. The lowest value of the sum of the contraction and exit rates has been used by the OECD (1987, p. 107) to provide an approximation to the minimum turnover that can be expected to occur when all cyclical elements are removed. It is 5.9 per cent (1972-73), compared to the mean annual gross job-loss rate of 8.4 per cent over the entire period. One interpretation of these differences is that 70 per cent of the normal job loss is structural, the remainder cyclical.

The relative response of the components of job loss and job gain to economic conditions has important implications for the adjustment process, as discussed previously. It has already been noted that exit rates are less variable than entry rates. This does not apply to the decline and growth rates in the continuing sector. Here there is no significant difference between the variances in the two. Indeed, the standard error of the mean employment-decline rate is larger, not smaller, than the growth rate. The implications of this finding will be addressed when the rates of adjustment in the longer run are discussed.

Focusing on the annual contraction and expansion rates, defined as the amount of employment change in each, relative to total manufacturing employment, may hide certain aspects that are important determinants of the costs of adjustment. The contraction rate depends upon the number of establishments that decline and the average annual rate of decline experienced by these establishments. Variability in the contraction rate may be the result of more establishments declining during recessions or greater rates of decline for those that reduce employment. If most of the variability occurs because of changes in the rate of decline, then the amount of adjustment per establishment is highly unstable. To the extent that adjustment is borne by a relatively constant number of establishments, adjustment is more costly because it is less likely to be marginal in nature. On the other hand, to the extent adjustment occurs by increasing the proportion of the total number of establishments that decline, the actual decline in employment per establishment will be relatively constant.

In order to investigate the determinants of the relative volatility in declining and growing continuing establishments, the proportion of total establishments for each year that exit, increase, decrease, or maintain constant employment was calculated. These ratios, reported in Table 3-6, show that, over the economic cycle, a substantial proportion of continuing establishments shift from the declining to the growing category and vice versa. For example, between 1976-77 and 1977-78, when the manufacturing sector moved from a net overall employment change of –1.6 to 2.2 per cent, employment in declining establishments dropped by some 7.4 percentage points and jumped by 7.9 percentage points in growing establishments. In contrast, the exit rate fell by only 0.5 percentage point. The probability of having constant employment remained virtually unchanged.

The absolute decline (or growth) in employment for contracting (expanding) establishments is presented in

Table 3-6

Annual Distribution of Manufacturing Establishments by Growth Class, Canada, 1970-81[1]

	Continuing establishments				
	Constant employment (1)	Declining employment (2)	Growing employment (3)	Exiting establishments (4)	Net percentage change in continuing establishments (5)
			(Per cent)		
1970-71	19.4	36.4	39.4	4.7	–0.27
1971-72	18.7	29.6	46.8	4.9	3.91
1972-73	17.8	28.1	50.2	4.0	5.33
1973-74	19.0	33.2	42.6	5.2	2.04
1974-75	12.6	41.3	41.5	4.6	–3.31
1975-76	15.1	37.4	42.6	4.9	0.59
1976-77	15.5	41.0	38.6	4.9	–0.48
1977-78	15.4	33.6	46.5	4.4	2.58
1978-79	14.3	35.6	45.7	4.4	3.03
1979-80	14.9	40.4	39.6	5.0	–1.17
1980-81	15.0	38.6	39.0	7.4	0.05
Mean	16.16	35.94	42.96	4.94	. . .
Standard error of mean	0.67	1.35	1.16	0.27	. . .
Coefficient of variation	0.041	0.038	0.027	0.055	. . .

[1] There will be differences between the exit and entry rates reported previously and those reported here. These percentages are calculated relative to the total number of establishments in the base period (i.e., those continuing, plus those that exited). Thus the sum of constant, declining, growing, and exits should equal 100 except for rounding. No corrections are made for the 1978 change in coverage (see Appendix B).

SOURCE Special tabulations provided by Statistics Canada.

Table 3-7

Annual Comparison of Employment Size of Growing, Declining, Entering, and Exiting Establishments in the Manufacturing Sector, Canada, 1970-81

	Average size of declining establishment	Average size of growing establishment	Average decline	Average growth	Average size of exiting establishment	Average size of entering establishment
			(Number of employees)[1]			
1970-71	102.4	76.3	13.5	12.0	27.3	19.6
1971-72	93.8	79.6	11.1	12.9	27.3	20.4
1972-73	89.0	86.7	11.1	14.0	28.5	19.4
1973-74	93.9	93.1	13.1	13.8	22.8	20.7
1974-75	109.5	67.5	18.4	12.1	26.6	23.6
1975-76	97.2	79.9	14.2	13.6	33.2	29.4
1976-77	93.7	87.8	13.3	13.2	28.7	28.5
1977-78	98.7	88.2	13.6	14.3	33.0	26.1
1978-79	86.2	92.5	12.6	15.0	25.6	27.3
1979-80	102.4	83.6	15.5	13.4	29.4	27.9
1980-81	94.4	89.6	13.3	13.3	28.9	29.5
Mean	96.48	84.08	13.62	13.41	28.10	24.76
Standard error of mean	1.98	2.32	0.61	0.27	0.91	1.24
Coefficient of variation	0.021	0.028	0.045	0.020	0.032	0.050

[1] Employees, here as elsewhere in these tables, include both production and salaried workers.

Source Special tabulations provided by Statistics Canada.

Table 3-7. The average decline was 13.6 employees over the period; the average increase was 13.4 employees. There was no significant difference between the two averages. Where, then, does adjustment occur – from establishments shifting from the growing to the declining category, or from changes in the average number of positions being lost? Clearly, it comes from both. However, the standard error of the mean number of establishments in the declining category is about 300; for the mean number of positions lost in such establishments, the standard error is less than 1. Therefore, generally, hundreds of establishments shift from the growing to the declining category and vice versa, but the *change* in the mean number of positions lost will generally be less than 2, with a mean of 13.6. Fluctuations in the amount of adjustment per establishment are not dramatic when viewed in this light.

Table 3-7 also contains the average size of exiting and entering establishments. In each case, the mean job change due to entry or exit is about twice as large as for continuing establishments that grow or decline. The absolute amount of change per unit, then, for the entering and exiting segment is large relative to the continuing segment.

In order to examine how the entry and exit process fluctuates over time relative to growth and decline in the continuing sector, the relative importance of entry to growing, as well as exiting to declining, establishments is calculated. This is done both in terms of the number of establishments and the employment change affected by both. The results are reported in Table 3-8. The number of exiting establishments is, on average, only 14.4 per cent of declining establishments; the number of entrants is, on average, only 12.2 per cent of growing establishments. However, employment in exiting establishments is 30.9 per cent, on average, of the employment change in declining establishments; employment in entering establishments is equal to 22.7 per cent of the employment change in growing establishments.

The annual ratio of employment in exiting establishments to the change in employment in declining establishments was correlated with economic activity (using the net employment change in the continuing segment), and a positive correlation which is significant was found – when the importance of each was measured with employment change. This is the result of a significant decrease in the declining segment as eco-

Table 3-8

Annual Importance of Entering and Exiting Relative to Declining and Growing Establishments in the Manufacturing Sector, Canada, 1970-81[1]

	Number of establishments		Employment affected		
	Exiting/ declining (1)	Entering/ growing (2)	Exiting/ declining (3)	Entering/ growing (4)	Net employment change in all continuing establishments (5)
			(Per cent)		
1970-71	12.8	20.2	25.8	32.9	–0.27
1971-72	17.4	13.3	42.6	22.9	3.91
1972-73	15.1	13.3	38.8	20.4	5.33
1973-74	17.1	17.4	30.9	28.6	2.04
1974-75	12.2	15.0	18.3	31.4	-3.31
1975-76	14.2	8.6	34.3	18.6	0.59
1976-77	12.7	6.3	29.1	13.6	–0.48
1977-78	12.6	8.8	32.8	18.1	2.58
1978-79	12.4	10.4	25.2	19.0	3.03
1979-80	12.5	12.5	23.7	26.0	–1.17
1980-81	19.1	8.4	38.5	18.5	0.05
Mean	14.4	12.2	30.9	22.7	...
Standard error of mean	0.84	1.27	2.22	1.87	...

1 This table contains the corrections made to account for the 1978 change in coverage. For details, see Appendix B.
SOURCE Special tabulations provided by Statistics Canada.

nomic activity picks up with virtually no change in exits. There is a significant negative relationship between the ratio of entrant employment to growing establishment employment change and economic activity.[17] Employment growth in the continuing sector responds more to changes in economic conditions than does increases in employment in entering establishments. Both results then confirm the greater volatility, in the short run, of the continuing, as compared to the entering and exiting, sector.

Job Turnover at the Establishment Level: A Comparison of the Short and Long Run

Continuing establishment employment change dominates the entry and exit process in the short run. Whether it also does so in the longer run, as structural adjustment occurs, depends on several factors. The first is the extent to which the fortunes of continuing firms are reversed quite quickly. Evidence suggests that substantial reversals occur (Birch, 1981, pp. 8-9; Hall, 1987; Leonard, 1987). Thus, longer-run job changes calculated for the continuing segment will be smaller than when calculated over the yearly periods.

The net effect of entry and exit may also be quite different in the short, as opposed to the long, run. If exits come almost entirely from entrants, then the cumulative exit rate for 1970 to 1971, for example, will be about the same as for 1970 to 1979 – as it has been calculated here. This is because the exits from the 1970 population will all occur quite shortly thereafter. The implicit annual rate for the 1970-79 period would then be considerably below the annual rate derived from yearly exit data.

There is a second reason for differences between yearly and longer-run entry and exit rates. The longer-term entry rate, when measured in terms of employment but not numbers, for example, depends on the rate of growth of entrants subsequent to their creation, as well as the exit ratio of new establishments. The long-run annualized entry rate will be higher than the short-run yearly rate, providing subsequent growth of entrants offsets the exit rate of new establishments.[18]

In order to examine the relative importance of the sources of job-loss change when calculated over longer periods, the rate of employment change was calculated by comparing the status of establishments in 1971 to

1976, in 1976 to 1981, and in 1971 to 1981. The rates of change calculated for entry, exit, and growing or declining establishments over the longer periods are reported in Table 3-9. Three sets of results are tabulated. The first set contains the cumulative rate of change obtained from comparing the status of establishments at the beginning and end of the period; the second, the implicit annual rates derived from these cumulative rates of change; and the third, the average annual rates derived from the year-to-year changes.

The year-to-year expansion and contraction rates for continuing establishments are considerably greater than the rates calculated over the longer periods. For example, the yearly contraction rates were some 6 per cent in each of the five-year periods; the implicit annual long-run decline rates were only about 2 per cent for each of these periods. Substantial reversals in the fortunes of continuing establishments took place. By way of contrast, the implicit long-run exit and entry rates are quite similar to the short-run rates. On the entry side, this is consistent with the view that growth by entrants offsets the effect of high rates of exit by these groups.

The long-run job change from either exit and contraction or entry and expansion is somewhat lower than that derived from yearly changes. This comes primarily from the lower long-run contraction and expansion rates in continuing establishments. Over the period 1971-81, the sum of the annual exit and decline rates implied by the yearly changes is 8.3 per cent, but the long-run implicit annual rate for gross job loss from both sources was only 3.6 per cent – somewhat less than half the yearly rate. Almost the same relationship holds for growth rates calculated from a comparison of the status of establishments in 1971 and 1981 compared to the year-to-year changes.

Table 3-9

Components of Job Gain and Loss in Manufacturing Establishments, Measured over Five- and Ten-Year Intervals, Canada, 1971-81[1]

	Entry rate	Continuing establishment growth rate	Total job growth rate	Entry/ total growth rate	Exit rate	Continuing establishment decline rate	Total job decline rate	Exit/ total decline rate
				(Per cent)				
Cumulative change from comparing endpoints								
1971-76	9.24	16.50	25.74	35.9	10.28	9.95	20.23	50.8
1976-81	10.26	15.10	25.36	40.5	9.95	11.39	21.34	46.6
1971-81	19.19	21.10	40.29	47.6	18.73	11.89	30.62	61.2
Implicit annual rates of change from comparing endpoints								
1971-76	1.78	3.10	4.68	...	2.15	2.07	4.42	...
1976-81	1.97	2.81	4.62	...	2.07	2.39	4.69	...
1971-81	1.77	1.93	3.44	...	2.05	1.25	3.59	...
Average annual rates derived from change based on year-to-year rates[1]								
1971-76	1.26	8.04	...	...	1.78	6.36	...	...
1976-81	1.74	7.38	...	...	1.90	6.56	...	...
1971-81	1.50	7.70	...	...	1.84	6.46	...	...

[1] It was not possible to make corrections for the 1978 change in coverage for the long-run rates. Therefore, for comparison purposes, the short-run year-to-year rates used are the uncorrected rates reported in Appendix B.

SOURCE Special tabulations provided by Statistics Canada.

While the annualized rates of change are lower in the long run, there is still a substantial percentage of initial employment affected. Gross job loss is some 20 per cent for each of the two five-year periods and 31 per cent for the decade 1971-81.

In the short run, the continuing segment dominated the job-turnover process. The annual exit rate calculated from year-to-year change over 1971-81 (1.84) was only 28 per cent of the continuing establishment decline rate (6.46). In the longer-run comparison, exit increases its relative importance. The ratio of the exit rate (2.05) to the continuing establishment job-contraction rate (1.25) is 164 per cent over the period 1971-81. Entry, too, increases its importance in the longer run, but not quite to the same extent as exit. Since exit and entry are much more important in the long run, it is the characteristics of these processes that will begin to dominate those of total adjustment.

Job Turnover at the Firm Level

Entry and Exit in the Short Run

The data allow examination of the annual entry and exit rates of firms both as the result of establishment openings and closures and as a result of mergers. Table 3-10 contains the average of the annual firm entry and exit rates over the period 1970 to 1983. On average, 6.8 per cent of firms exited annually, affecting 3.4 per cent of employment. On the other hand, entry added 6.2 per cent to the stock of firms[19] and 2.3 per cent to the number of jobs.

Table 3-10

Average Annual Entry and Exit Rates of Firms in the Manufacturing Sector, Canada, 1970-71 to 1982-83

	Total	By merger	By establishment opening or closure
		(Per cent)	
Method of calculation:			
Number of establishments			
Entry	6.24	0.66	5.58
Exit	6.75	1.22	5.53
Employment affected			
Entry	2.31	1.22	1.09
Exit	3.42	2.06	1.36

SOURCE Special tabulations provided by Statistics Canada.

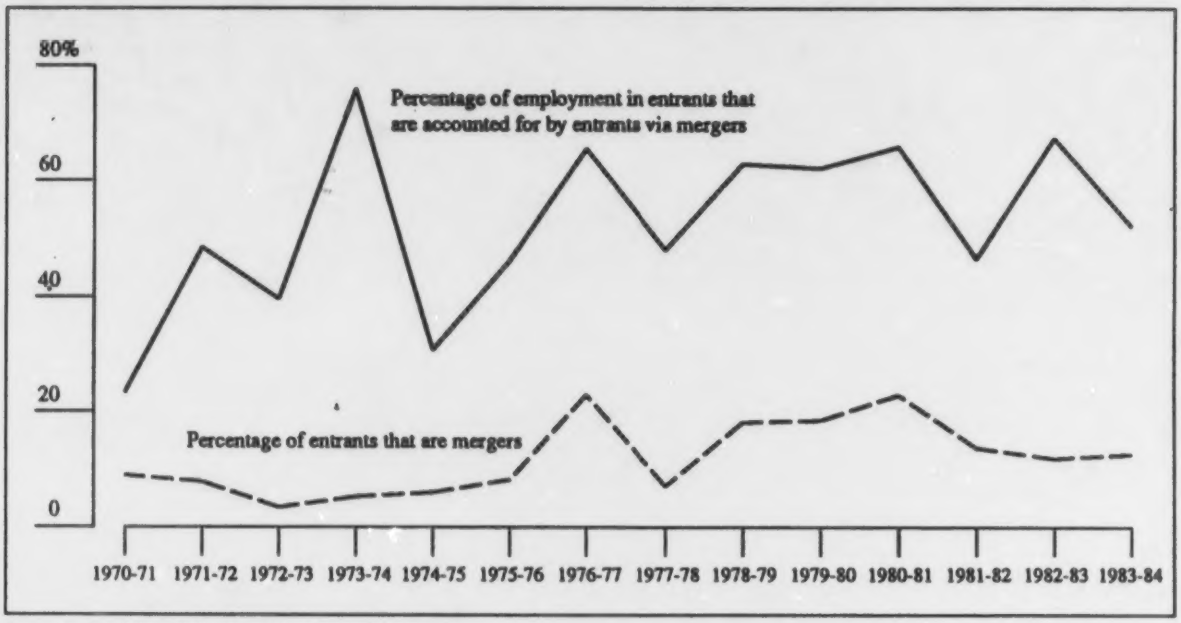
Contrary to establishment entry and exit rates, the firm rate does not involve just the birth and death of establishments. It also involves the transfer of establishments from one firm to another through a merger. The two processes are inherently different and have different implications for adjustment costs. Establishment closure is likely to lead to forced movement for all of the labour force. Establishment divestment is less likely to do so, providing the new management is successful in searching for new economic opportunities. Owners of capital may also be presumed to have a lower capital loss when their assets are purchased in comparison to the situation where they have to be liquidated or dismantled.[20]

For these reasons, it is important to separate the firm rates into those arising from establishment creation and closure, and those arising from merger activity. This is done in Table 3-10. The predominant method of exit by firms leaving the manufacturing sector is via closure of establishments rather than by divestiture, when measured by the number of firms. Exit rates by merger averaged 1.2 per cent but 5.5 per cent by establishment closure. While exits by closure are more numerous than exits by divestiture, the average size of the typical firm that exited by establishment closure was much smaller than that of the typical firm that exited by divestiture. As a result, merger exit rates, when calculated in terms of employment, are larger than establishment closure rates (2.1 per cent as opposed to 1.4 per cent). This suggests that care must be used in interpreting studies of job turnover that use firm-based data on entry and exit that include the effect of mergers.

The averages in Table 3-10, however, conceal considerable fluctuations over time in the importance of the two components of firm entry and exit. For example, the firm exit rate associated with establishment closure is much more stable than the merger rate. The latter reflects the well-known tendency of mergers to occur in waves. In Chart 3-1, the relative importance of the merger component in entry over the period is graphed. Mergers varied considerably in importance, with an increase toward the end of the period. This is significant because it means that firm-based job-creation studies that are unable to remove the merger component will be biased and the bias may vary considerably over time. Finally, the variability in the merger series will affect the relative volatility of both the entry and exit series and, therefore, submerge the underlying difference in

Chart 3-1

The Importance of Mergers in the Entry Process in the Manufacturing Industries, Canada, 1970-71 to 1983-84



Source Special tabulations provided by Statistics Canada.

the establishment opening and closure series that was observed in the previous section.

Together, the firm and establishment data can be used to compare the establishment exit and entry rates for firms that leave or enter, as opposed to those that continue.[21] This is done in Table 3-11. Exiting firms account, on average, for two-thirds of the employment affected by establishment closures; entering firms account for about the same percentage of employment affected by establishment openings. Of interest is the fact that the volatility of the two exit rates is about the same. Both continuing and exiting firms appear to display an establishment closure rate that is influenced to the same degree by economic conditions. This is not the case on the entry side. The establishment opening rates by continuing firms are less, not more, volatile than their exit rates. They are also less volatile than the establishment opening rates of new firms. Continuing firms, then, do not respond to upswings in the same fashion as do new firms, because they have the option of expanding production in existing establishments. Thus, while adjustment overall appears to come more on the establishment opening than on the establishment closure

Table 3-11

Comparison of the Source of Job Turnover from Establishment Opening and Closure in the Manufacturing Sector, Canada, 1970-71 to 1979-80

	Total establishment job turnover rate (1)	Firm job turnover via establishment opening and closure (2)	Continuing firm job turnover via establishment opening and closure (1) – (2) (3)
		(Per cent)	
Source:			
Entry[1]	1.65	1.09	0.56
Exit[1]	1.87	1.25	0.62

1 Calculated as the mean of the annual rates of employment change using base-year employment. Modifications were made to both the firm and establishment entry and exit rates in accordance with the discussion in Appendix B.

Source Special tabulations provided by Statistics Canada.

side, this must be ascribed to entering and exiting firms and not to continuing firms.

Conclusion

Policy makers are constantly forced to address the implications of changes in government programs on employment. For example, debates over the advantages of trade liberalization have long wrestled with the extent to which there are substantial costs to removing tariffs and other trade barriers. A central presumption of some is that there is little leeway for resource reallocation without incurring substantial costs. While it has been recognized that some resources are constantly being reallocated in a market economy, few attempts have been made to measure this process. The data presented here shed light on the size and the pattern of the ongoing gross job loss due to the decline and exit of establishments and firms.

Each year, a large and relatively constant percentage of jobs in manufacturing are displaced as a result of establishment decline and exit. The amount of displacement differs depending on the time period used. In the short run, establishment closure by both exiting and continuing firms displaced, on average, about 1.9 per cent of employment annually during the period 1970-81. In addition, job loss in contracting establishments accounted for another 6.5 per cent of manufacturing employment annually. Together, the gross job loss resulting from both sources was more than 8 per cent, when measured on an annual basis. When calculated using endpoints five years apart, the implicit annual gross job-loss rate was over 4 per cent; over the ten-year period, it was 3.6 per cent. In the latter case, this means the decline in jobs associated with producer contraction and exit amounted to some 30 per cent of the base-year employment over the decade.

Predictions of the impact on employment of policy changes, such as those associated with trade liberalization, require a benchmark against which they can be measured. This chapter provides two such standards: the long run and the short run. In the long run, the release of employment due to contracting and exiting establishments provides an estimate of the effect of a changing structure – albeit at the level of the producing unit. It measures the net effect of the various forces affecting the fate of each production unit.

In the long run, employment loss is dominated by the exit process. Exit is part of a self-selection phenomenon. While numerous exogenous changes in the environment, from technological progress to changes in trade policy, affect firms in any industry, the aggregate failure rate over time is relatively constant. This suggests that it is not so much the exogenous shock that matters as the ability of management to adapt. In any population, there will be a relatively constant percentage who cannot do so in any one year and who will subsequently fail; but, over a decade, this accounts for about 20 per cent of base-year employment. The fact that the exit process is relatively unaffected by economic conditions means that there is a natural rate of adjustment that continually takes place. A certain percentage of resources would normally be expected to leave an industry each year because of firm decline.

The evidence also indicates that an industry's net employment rate differs over time primarily because of differences in yearly entry rates, not yearly exit rates; industries grow not so much by reducing exit rates as by increasing entry rates. Adaptation then occurs in the growing segment since workers who would normally lose their jobs because of the dynamics of firm decline move to other firms that are growing.

If it is true that there is a relatively constant rate of exit and there is virtually no change in the exit rate when an industry *begins* to decline, it may be that adjustment comes only from a diminution in entrants. In this case, there will be some rate at which an industry may be contracted without forcing any additional adjustment on the work force beyond that normally being experienced. But such a conclusion can only be made with caution at this stage. In the early 1980s, during the worst recession since the 1930s, exit rates did increase. Of course, this may just indicate that the rate of overall decline at this time was above the rate that does not lead to additional exits. It is also the case that for those industries that declined between 1970 and 1979, the exit rate was higher than for industries that experienced growth. But again, this may only indicate that the mean rate of employment loss for those industries in decline was higher than the rate at which exits remain relatively constant. Nevertheless, both observations mean that those who would argue that downward adjustment can be accomplished without additional worker displacement must tread carefully. On the other hand, the data adduced here demonstrate that when growth is negative, adjustment comes both on the entry and exit side; that, in turn, implies that not all of the decline that goes with this type of structural adjustment results in higher rates of worker displacement.

If exit rates are relatively constant, and entry rates variable, then it is the birth process that essentially determines whether a region will have a growing economy. This suggests that industrial strategy should not try to prevent the inevitable deaths that will occur, but that it should encourage the birth process. The birth process is heavily dominated by small firms and establishments. Industrial strategy, if it is to have a salutary impact on regional growth, should focus on those matters that facilitate entry and growth by these smaller firms by, for example, removing market imperfections.

In contrast to the long-run standard used above, the amount of employment change in the short run can also be used as a benchmark against which the effects of proposed policy changes, like trade liberalization, can be judged. If this standard is adopted, the degree of "normal" employment change increases dramatically. Gross job loss from contraction and exits of manufacturing establishments averaged some 8 per cent, when calculated annually. This is much larger than the implicit long-run rate of change because it is made up of both a structural and a cyclical component. The cyclical effect, when measured at the establishment level, is reversed in the long run. However, while it was reasonable to assume that employment decline measured over five- and ten-year periods is associated with worker reallocation, such is not necessarily the case for year-to-year changes that may involve only a temporary displacement of workers. Whether the short- or longer-run estimates of job loss more closely reflect the degree to which workers move will depend upon the extent to which workers, when separated from their jobs in the short run, move to new ones. In order to examine this phenomenon, separation rates of the labour force must be examined. This is the subject of Chapter 6.

4 Job Turnover in Canada's Manufacturing Sector Relative to Other Major Sectors

The previous chapter examined the degree of change in the manufacturing sector that occurs as the result of the growth and decline of firms and their establishments. The amount of change, whether measured in terms of the percentage of firms affected or employment involved, is large.

This chapter compares the amount of job change and its sources in the manufacturing sector to other sectors. It asks the same questions about the experience of these other sectors as did Chapter 3. Is the amount of employment turnover due to changing firm fortunes large or small? Is there also a large exit component in other sectors that is relatively invariant to economic conditions? Does adjustment occur primarily on the entry as opposed to the exit side? How important are entry and exit over the long run? The answers to these questions permit an evaluation of the extent to which the pattern of change in manufacturing is unique.

Data for job turnover in manufacturing are more readily available and perhaps more comprehensive because of the emphasis the goods-producing sectors have traditionally received from statistical collection agencies. The Canadian Census of Manufactures does not have a similar historical counterpart in the service sector, apart from some selective surveys. However, two databases, which permit certain aspects of job turnover to be measured for sectors other than manufacturing, have been developed recently. The first is a firm-based longitudinal data file, developed by Statistics Canada, that provides measures of the components of employment change for firms. The second is a private-sector database, produced by Dun and Bradstreet, that links establishments to owning firms. It provides employment change at the establishment level. Neither is perfectly suited for these tasks, but once their shortcomings are understood, these sources can be used to compare the components of job growth across broad sectors of the economy other than manufacturing. This chapter examines these sources to see whether the patterns of adjustment that were previously observed for manufacturing emerge in other sectors.

Job Turnover at the Firm Level

The Longitudinal Employment Analysis Program File

The recent creation by Statistics Canada of the Longitudinal Employment Analysis Program (LEAP) database, which is based on the payroll records that all employers must file with the tax authorities, permits a comprehensive examination of the turnover process at the firm level.[1] Employment changes for continuing, newly identified, and no longer identified firms are available for the period 1978-86. The latter two categories will be used here generally to measure the birth and death process.

A shortcoming of the present LEAP file for examining employment turnover arises because the effect of mergers has not been excluded from the firm birth and death categories. Baldwin and Gorecki (1983), using establishment data from the Census of Manufactures, found that merger entry is nearly as important as new establishment entry when cumulated over the period 1970-79 (Table 3-1). On an annual basis, furthermore, there is considerable fluctuation in the relative importance of mergers, compared to entry via new establishment (Chart 3-1). Therefore, using the LEAP file, rates of job gain may not exactly equal rates of job creation; rates of job loss may not equal rates of job destruction. If the codes that are attached to firms (BRID numbers)[2] in the LEAP file frequently change when mergers occur, the employment-creation and -destruction rates calculated from it in the birth and death categories will be overstated.[3] The amount by which this occurs is an empirical matter.[4]

A Comparison of Job Turnover Based on the LEAP File and the Census of Manufactures

A comparison of job turnover at the level of the manufacturing sector derived from the LEAP file and the Census of Manufactures, the data source for Chapter 3, is presented in Table 4-1. The first census-based estimate, column 2, uses firms to measure growth and de-

Table 4-1

Comparison of the Components of Annual Employment Change[1] Derived from the LEAP File and the Census of Manufactures, Canada, 1978-81

	LEAP file	Census of Manufactures		
	Firm (1)	Firm[2] (2)	(3)	Establishment (4)
	(Per cent)			
Category:				
Exit	1.5	5.1	1.5	2.0
Continuing declining	6.0	6.1	. .	6.7
Gross job loss	7.5	11.0	. .	8.7
Entry	1.3	2.4	0.8	1.4
Continuing expanding[3]	8.1	9.9	. .	7.4
Gross job gain	9.4	12.5	. .	8.8

1 Annual percentage change in employment averaged over the period 1978-81. Both data sources refer to manufacturing sector employment.

2 Column 3 differs from column 2 in that merger entry and exit have been excluded. Thus column 3 includes just the rates of firm exit via establishemnt closure and firm entry via establishment creation.

3 The census firm average is probably biased upwards by the 1980-81 result which is anomalous. If we use the 1978-80 average, the numbers for this row are 8.9, 8.4, and 7.7 per cent, respectively.

SOURCE Special tabulations provided by Statistics Canada.

cline and includes mergers in entry and exit. Column 3 also uses firms, but excludes the effects of mergers from exit and entry. Column 4 uses establishments to measure job turnover in manufacturing.

In evaluating the results in Table 4-1, it is important to remember that the definitions of firms and employment differ between the LEAP and the census files. Employment in the LEAP file is measured in terms of average labour units. It is a construct derived by dividing payroll by average annual earnings data. Employment in the Census of Manufactures file consists of all production and nonproduction workers. It is based on an average annual employment concept.[5]

The firm in the LEAP file is created by aggregating establishments to a business level. This aggregation does not bring all establishments in, say, manufacturing under common control together. Rather it aggregates establishments to a legal entity for corporations and a whole business for unincorporated firms. The resulting firm is somewhat smaller than the unit used in the census. The firm in the work reported in Chapter 3, which uses the Census of Manufactures data, is defined as all establishments in manufacturing and primary industries under common control. This is a broader definition of the firm than that used in the LEAP file.

From the evidence presented in Table 4-1, it appears the LEAP file contains some but not all of entry that occurs via mergers. The importance of entry and exit in manufacturing derived from the LEAP file is considerably lower than that given by the version of the census file that includes mergers as a form of entry. It is slightly higher than the version that excludes merger entry. Firm entry by new establishment is 0.8 per cent and exit by establishment closure is 1.5 per cent when the census firm database, excluding merger entry, is used. This is only slightly below the LEAP file results for entry (1.3 per cent), but there is no difference on the exit side. Overall, firm entry and exit rates when taken together are slightly higher in the LEAP file, as expected, because mergers are included in births and deaths; however, the differences are not large.

By way of contrast, the sign of the difference to be expected between the LEAP firm entry and exit results (column 1) and those of the census establishment file (column 4) are difficult to predict. On the one hand, mergers will lead to firm entry and exit in the LEAP file with no necessary counterpart in the establishment file. On the other hand, LEAP rates do not include establishment births and deaths that occur in the continuing segment. The census establishment entry and exit rates are both higher than the comparable rates derived from the LEAP file.[6] Once again, the differences are small.

Continuing sector growth and decline in a firm-based file should not be the same as in an establishment file.[7] Continuing firm growth and decline will contain not only continuing establishment growth and decline but also mergers and continuing firm establishment births and closures. The effect of this is to reduce the continuing firm decline rate in the LEAP file below the continuing establishment decline rate and to increase the continuing firm expansion rate above the continuing establishment expansion rate – but by less than 1 percentage point in both instances.[8] The results, then, for the continuing firm segment in manufacturing in the LEAP file are quite close to the establishment data generated by the census file.[9] The difference between the two sources for gross job gain and loss is of the same magnitude.

Measuring employment changes on a firm basis catches the extent to which jobs are transferred from one entity to another. This includes transfers due to births and deaths as well as mergers. Observing change on an establishment basis catches movement from one establishment to another. The first captures the extent to which firms rise and fall; the second, the extent to which establishments do the same. It is the latter that is more closely related to actual job displacement.[10]

The LEAP file, while a firm-based data set, has been constructed in such a way that it closely, though not perfectly, reflects employment turnover at the establishment level in manufacturing. Entry, however, captures establishment births in a new firm but misses establishment creation in a continuing firm. With this caveat in mind, the LEAP file can be used to examine the questions posed earlier about the pattern of employment change for the late 1970s and early 1980s in major sectors of the economy other than manufacturing. Caution must be exercised, however, in using the LEAP file for finer levels of industry classification, geographical disaggregations below the Canada level, and/or for other periods to make inferences about job change, without conducting the sort of examination presented in Table 4-1.

Job Turnover in the Manufacturing Sector Relative to Other Sectors

The birth and death rates derived from the LEAP file, calculated in terms of the number of firms, are reported in Table 4-2 for all sectors of the Canadian economy, except public administration, for the years 1978-86. Many other databases are not as comprehensive, especially when it comes to small firms. Therefore, the entry and exit rates are computed for three different groups to show the effect of coverage of different size classes. They are calculated for all firm sizes (columns 1 and 2), for small firms with less than five employees (columns 3 and 4), and for large firms with five or more employees (columns 5 and 6). Several points emerge from the data.

First, small firms and large firms differ in terms of exit rates. For the smaller-size class, 55.6 per cent of the firms in 1978 disappear by 1986. For larger firms, only 36.3 per cent close by 1986. Second, irrespective of the coverage used, death rates have less variability than birth rates. This is particularly evident during the 1981-82 recession when exit rates barely change; almost all of the change comes on the entry side. Third, the average birth and death rates, when defined using the number of

Table 4-2

Firm Entry and Exit Rates,[1] Derived from the LEAP File, Canada, 1978-86

	All firms		Firms with less than five employees		Firms with five or more employees	
	Birth (1)	Death (2)	Birth (3)	Death (4)	Birth (5)	Death (6)
			(Per cent)			
1978-79	20.0	15.1	23.3	17.8	10.3	7.0
1979-80	20.3	14.8	24.7	17.8	8.4	6.6
1980-81	20.4	14.6	24.6	17.3	8.6	6.7
1981-82	17.1	15.3	20.5	18.0	6.8	7.1
1982-83	20.4	14.4	24.3	16.6	8.1	7.4
1983-84	18.4	15.6	21.3	18.1	8.4	7.1
1984-85	19.6	14.3	22.9	16.7	8.8	6.3
1985-86	18.7	15.0	21.8	17.6	8.6	6.8
Mean	19.4	14.9	22.9	17.5	8.5	6.9
Standard error of mean	0.42	0.16	0.56	0.20	0.34	0.12
1978-86	92.6	50.6	107.3	55.6	49.7	36.3
Implicit annual rate	8.5	8.4	9.5	9.6	5.2	5.4

1 All rates are calculated relative to the number of firms in the size category in the base year for all sectors except public administration.
SOURCE Special tabulations provided by Statistics Canada.

firms, are quite sensitive to the cutoff level inherent in the collection method used. The mean annual entry rate, when calculated across all firms, is 19.4 per cent over the period 1978-86. When firms with less than five employees are removed, the mean annual birth rate falls to 8.5 per cent; the death rate to 6.9 per cent.

The manufacturing firm entry and exit rates derived in Chapter 3 used only those firms with establishments that filed a "long" form with Statistics Canada.[11] The sample was truncated by the omission of the smallest firms. The firm entry rate using this sample averaged only 5.5 per cent per year between 1978 and 1981; the death rate, 6.7 per cent. The mean firm entry rate for manufacturing derived from the LEAP file in the same period was 12.9 per cent; the mean death rate, 9.1 per cent (see Table 4-3). However, the LEAP file birth and death rates for firms with more than five employees were 5.9 and 5.1 per cent, respectively. This is close to the rate yielded from the Census of Manufactures sample.

Omitting the smallest-size class affects the estimated entry and exit rates, when calculated using the number of firms, in the LEAP file. However, the smallest-size class (less than five employees) accounted for a small percentage of employees affected by entry and exit in manufacturing – only about 12 per cent for firm births and 6 per cent for firm deaths on average for the same three years (1978-81). Entry and exit rates using employment will, therefore, be much less sensitive to the coverage of different size classes.

In order to demonstrate the effect of using different size samples, rates of entry and exit were calculated for the period 1978-86 for the manufacturing sector, both for all firms and for those firms with five or more employees. The results are reported in Table 4-3. Entry and exit rates, based on the number of firms, fall dramatically when those firms with less than five employees are excluded. The decline is much less when rates of change using employment affected by births and

Table 4-3

Firm Entry and Exit Rates,[1] Derived from the LEAP File, Using Number of Firms and Employment, Manufacturing Sector, Canada, 1978-86

	Birth				Death			
	Number of firms		Employment		Number of firms		Employment	
	All firms (1)	Firms with five or more employees (2)	All firms (3)	Firms with five or more employees (4)	All firms (5)	Firms with five or more employees (6)	All firms (7)	Firms with five or more employees (8)
					(Per cent)			
1978-79	13.7	7.2	1.6	1.5	9.4	5.4	1.8	1.7
1979-80	12.8	5.4	1.2	1.1	8.8	4.9	1.3	1.3
1980-81	12.3	5.1	1.0	0.9	9.0	5.0	1.5	1.4
1981-82	10.5	4.4	0.8	0.7	9.9	5.5	1.2	1.1
1982-83	13.3	5.4	1.1	0.9	10.3	6.1	1.7	1.6
1983-84	13.8	6.0	1.9	1.8	9.8	5.5	2.2	2.2
1984-85	14.3	6.2	1.6	1.4	10.0	5.3	1.6	1.5
1985-86	14.0	5.8	1.2	1.0	10.1	4.8	1.7	1.6
Mean	13.1	5.7	1.3	1.2	9.7	5.3	1.6	1.6
Standard error of mean	0.44	0.29	0.13	0.13	0.19	0.15	0.11	0.11
1978-86	72.2	33.1	13.9	10.4	41.4	33.1	15.9	15.4
Implicit annual rate	7.0	3.6	1.6	1.2	6.5	4.9	2.1	2.1

[1] All rates of change are calculated relative to the base-year number of firms or total employment in the manufacturing sector.

SOURCE Special tabulations provided by Statistics Canada.

Table 4-4

Annual Gross Job-Loss Rates[1] of Firms, Derived from the LEAP File, by Sector, Canada, 1978-86

	Gross job loss[2]								Exit/gross job loss,[3] 1978-81, 1983-86
	1978-79 (1)	1979-80 (2)	1980-81 (3)	1981-82 (4)	1982-83 (5)	1983-84 (6)	1984-85 (7)	1985-86 (8)	(9)
					(Per cent)				
Primary	15.4	16.3	18.1	22.7	16.3	15.5	14.5	16.7	28.0
Mines, quarries, and oil wells	5.6	5.3	8.5	16.9	16.0	8.3	11.2	13.3	19.6
Manufacturing	7.4	8.0	7.3	12.9	12.8	7.0	7.3	7.8	22.8
Construction	18.5	19.0	16.9	24.2	24.4	20.8	17.2	16.2	20.9
Transportation, communications, and other utilities	7.7	9.3	5.8	8.3	10.3	4.9	6.0	7.4	17.7
Wholesale trade	9.3	10.0	10.5	15.2	15.5	10.5	9.3	11.1	26.8
Retail trade	7.6	8.0	8.2	11.4	11.5	8.1	9.0	9.6	28.6
Finance, insurance, and real estate	6.1	6.4	9.1	9.7	10.1	8.1	7.8	7.7	23.5
Community, business, and personal services	7.1	7.1	7.6	9.2	10.5	7.2	7.9	8.0	29.8
All industries	8.2	8.7	8.5	12.0	12.4	8.3	6.5	9.0	26.5

1 All rates are calculated as percentages of the total base-year employment.

2 Gross job loss is defined as jobs lost from exits of firms and from the decline in employment in continuing firms whose employment fell. The effect of divestiture is not separated from these data. For a description of the firm and employment concept and the derivation of the data, see Appendix C.

3 Calculated as the mean of the ratio of the exit rate to the gross job-loss rate for the years indicated.

SOURCE Appendix C.

deaths are used. Once again, the birth process is more variable than the death process, irrespective of the size class used or the method of measurement.

Annual data between 1978 and 1986 for job losses and gains, calculated for nine broad industry classifications and the economy as a whole from the LEAP file, are presented in Appendix C. These broad industry classifications – sectors – include not only manufacturing but also primary industries; mines, quarries, and oil wells (mines); construction; transportation, communications, and other utilities (transportation); retail trade; wholesale trade; finance, insurance, and real estate (finance); and community, business, and personal services (community services). For each sector, the net job gain, the job gain and loss in continuing firms, the net change due to entry minus exit, the job gain in entering firms, and the job decline due to exits are calculated as a percentage of the previous year's total employment in the sector. These data shed light on the questions that were posed in Chapter 3 about the pattern of job gain and loss.

In order to address these questions, the period from 1978 to 1986 is broken into three separate subperiods. From 1978 to 1981, employment growth was generally positive in each sector. In 1981 and 1982, Canada experienced one of its most severe contractions in output since the early 1930s. The work of both Baldwin and Gorecki (1983) and Birch (1981) suggest that exit rates and job-loss rates are relatively constant, except where growth turns negative. This is confirmed for the annual data summarized in Table 4-4. For each sector, the exit rates are relatively constant for the years of positive growth – but they are much higher during the two recession years. A characterization of the adjustment process "normally" at work must carefully specify the macroeconomic conditions assumed. In what follows, averages for the years 1978-81 and 1983-86 are used to describe the "normal" adjustment process, because these were years of positive growth rates for most of the sectors.[13]

The first question of interest is whether gross job gain and loss are large relative to the amount of net job change that occurs annually. The evidence, presented in

Appendix Table C-1, suggests this is the case. Taking 1978-79 as an example, the net rate of job creation for all firms, except those in the public administration sector, was 4.8 per cent. Of this, 4.4 per cent came from continuing firms and 0.4 per cent from net firm creation (entrants minus exits). But there were more job transfers within these categories than these net changes might suggest. Job expansion in continuing firms amounted to 10.4 per cent of total base-year employment; job loss in declining firms to 6.0 per cent of 1978 employment. The sum of the absolute values of the expansion and contraction rates gives an overall measure of change that will be referred to as the firm-related turnover rate. For the continuing firm category, it amounted to 16.4 per cent. In the entry and exit categories, net job creation was 0.4 per cent: a job expansion of 2.6 per cent from entrants minus a job loss of 2.2 per cent from exiting firms. Here the firm-related turnover rate was 4.8 per cent. The overall gross job-turnover rate was 21.2 per cent for a net gain in employment of only 4.8 per cent.

Similar results hold for the individual industry sectors. In Table 4-5, the average annual net job-creation (column 1) and gross turnover rates (column 2) are summarized for the years 1978-81 and 1983-86 for different sectors. Employment changes are broken down into two components: those arising from growth and decline in continuing firms (columns 3 and 4) versus those arising from entry and exit (columns 5 and 6). The firm-related turnover rates are much larger than the corresponding net job-creation rate in all sectors. If volatility is measured by any of the three turnover rates in Table 4-5, the transportation sector is the least volatile, the primary and construction sectors are the most volatile. The table also shows that the annual net change is much greater in the continuing firm sector than in the entering/exiting sector – as are the turnover rates.

These data also shed light on the second question: the size of the normal or usual contraction rate. If exit and contraction rates have a substantial stochastic compo-

Table 4-5

Comparison of Firm Net Job-Gain Rates with Turnover Rates, Derived from the LEAP File, by Sector, Canada, Annual Averages for the Periods 1978-81 and 1983-86

	Net job creation[1] (1)	Gross job turnover[2] (2)	Continuing firm net job creation[3] (3)	Continuing firm job turnover[4] (4)	Birth and death net job creation[5] (5)	Birth and death job turnover[6] (6)
				(Per cent)		
Primary	4.6	36.8	2.3	25.5	2.3	11.3
Mines, quarries, and oil wells	5.8	23.3	5.8	19.8	0.1	3.4
Manufacturing	2.6	17.5	2.9	14.4	-0.3	3.1
Construction	4.1	40.2	3.3	32.0	0.7	8.3
Transportation, communications, and other utilities	0.1	13.8	0.3	11.7	-0.1	2.2
Wholesale trade	3.9	24.2	4.2	19.0	-0.3	5.1
Retail trade	5.5	22.3	5.0	17.1	0.4	5.2
Finance, insurance, and real estate	3.4	18.6	3.2	14.8	0.2	3.8
Community, business, and personal services	5.0	20.0	4.2	14.7	0.8	5.3
All industries	3.8	20.9	3.5	16.1	0.3	4.8

1 Gross job gain less gross job loss from all sources divided by base-year employment.
2 Gross job gain plus gross job loss as a percentage of base-year employment.
3 Net job creation in continuing firms as a percentage of base-year employment.
4 Job gain plus job loss in continuing firms as a percentage of base-year employment
5 Job gain from entry less job loss from exits as a percentage of base-year employment.
6 Job gain from entry plus job loss from exits as a percentage of base-year employment.
Source Appendix C.

nent that is unrelated to small changes in economic activity, the size of this component determines the amount of adjustment to exogenous events continually taking place and measures the extent to which a particular sector contributes to the ongoing volatility of the economy. These rates are presented in Table 4-6, once again as annual averages, for the years 1978-81 and 1983-86.

Since gross job-loss rates differ by industry, there must be certain sector characteristics – technology, the nature of demand, the type of government regulation, the ratio of sunk to variable costs – that condition this normal rate. The transportation sector has the lowest rate of gross job loss, with an annual average of only 6.9 per cent overall. The most volatile are the primary and construction sectors, with average annual gross job-loss rates of 16.1 and 18.1 per cent, respectively. The rate for all industries is 8.5 per cent, with the three largest sectors in terms of employment (manufacturing, retail trade, and community services) all being close to the average. While retail trade and community services have been growing at the expense of the manufacturing sector, this should not impact dramatically upon overall volatility – at least as defined herein.

The third question posed was whether adjustment occurs on the expansion rather than the contraction side. The data presented in Appendix C indicate that there is a relatively large gross job-loss rate, even when growth is positive, and that birth rates are more volatile than exit rates for these periods. In all nine sectors, overall gross job-gain rates are more volatile (based on both the range of the estimates and their variances) than gross job-loss rates over the six years from 1978 to 1981 and 1983 to 1986.

Table 4-6

Importance of Exit as Opposed to Contraction of Existing Firms, Derived from the LEAP File, by Sector, Canada, Annual Averages for the Periods 1978-81 and 1983-86

	Components of gross job loss			
	Exit[1] (1)	Continuing firm contraction[2] (2)	Gross job loss (1) + (2) (3)	Exit/ gross job loss (1)/(3) (4)
	(Per cent)			
Primary	4.5	11.6	16.1	28.0
Mines, quarries, and oil wells	1.7	7.0	8.7	19.6
Manufacturing	1.7	5.8	7.5	22.8
Construction	3.8	14.3	18.1	20.9
Transportation, communications, and other utilities	1.1	5.7	6.9	17.7
Wholesale trade	2.7	7.4	10.1	26.8
Retail trade	2.4	6.0	8.4	28.6
Finance, insurance, and real estate	1.8	5.8	7.6	23.5
Community, business, and personal services	2.2	5.2	7.5	29.8
All industries	2.2	6.3	8.5	26.5

1 Job loss due to firm exits as a percentage of base-year employment.
2 Job loss in continuing firms that declined as a percentage of base-year employment.
SOURCE Appendix C.

The tables in Appendix C also show that the adjustment process changed markedly during the 1981-83 recession. Gross job-loss rates, which had been relatively constant prior to 1981, increased dramatically during the recession. A little over half the change in net job creation comes from an increase in gross job loss. But all of this came from contraction in continuing firms. The exit rate remains unchanged, at least at the start of the recession. There is a weak negative correlation between the job-loss rate and the proportion of the change in net jobs accounted for by a change in gross job loss across industrial sectors. Higher rates of normal job loss cushion the extent to which job loss increases when a recession occurs, that is, where normal rates of job loss are high, a decrease in employment tends to be accomplished through fewer new jobs being created than more jobs being lost. Finally, when employment resumes its positive growth after the recession, contraction and exit rates decline to their prerecession levels.[13]

The data in Table 4-6 can be used to answer the fourth question as it relates to exit: the importance of job loss due to exits relative to that caused by contracting firms. If there is more dislocation when a firm completely disappears, exits will be more costly per job lost. Using the ratio of employment lost from exits to gross job loss, the primary sector is once again ranked at the top of the list – but so too are wholesale trade, retail trade, and community services. The service sectors (wholesale, retail, finance, and community services) have a higher percentage of gross job loss due to exits than does manufacturing, perhaps because the average size of their firms is smaller. It is in this sense that some of the service sectors may be said to have higher adjustment costs to fluctuations in economic activity. On the other hand, the amount of owner capital that is specific to a firm may be much lower in the smaller-sized units in these sectors than in manufacturing.

Table 4-7 provides data similar to that contained in Table 4-6, but for the job-growth process – entrants and expanding continuing firms. Once again, the primary and construction sectors are the most volatile with average annual gross job-gain rates between 1978-81 and 1983-86 of 20.7 and 22.1 per cent, respectively. The lowest job-gain rate occurs in transportation.

Table 4-7

Importance of Entry as Opposed to Expansion of Continuing Firms, Derived from the LEAP File, by Sector, Canada, Annual Averages for the Periods 1978-81 and 1983-86

	Components of gross job gain			
	Entry[1] (1)	Continuing firm expansion[2] (2)	Gross job gain (1) + (2) (3)	Entry/ gross job gain (1)/(3) (4)
	(Per cent)			
Primary	6.8	13.9	20.7	32.6
Mines, quarries, and oil wells	1.7	12.8	14.5	12.0
Manufacturing	1.4	8.7	10.1	14.0
Construction	4.5	17.6	22.1	20.4
Transportation, communications, and other utilities	1.0	6.0	7.0	14.9
Wholesale trade	2.4	11.6	14.1	17.4
Retail trade	2.8	11.0	13.9	20.8
Finance, insurance, and real estate	2.0	9.0	11.0	18.7
Community, business, and personal services	3.0	9.5	12.5	24.3
All industries	2.6	9.8	12.4	20.9

1 Job gain due to firm entry as a percentage of base-year employment.
2 Job gain in continuing firms that expanded as a percentage of base-year employment.
SOURCE Appendix C.

The proportion of the gross job-gain rate accounted for by firm entry compared with firm expansion reveals how "open" an industry is to new firms that create establishments, or conversely, the extent to which incumbents have an advantage. Rigidities that are the result of market imperfections can slow the adjustment process.[14] Market imperfections are less likely where entry is relatively easy. The proportion of gross job-gain accounted for by entrants is a measure of the degree to which incumbents are protected from new firms that create establishments. It reflects the degree to which competition from these outsiders can be expected to develop and perhaps accelerate the adjustment process on the positive side. This measure is presented in Table 4-7, column 4. The mining sector has the lowest proportion of job gain due to new entry – around 12 per cent. Manufacturing, transportation, and wholesale trade are next ranging from 14.0 to 17.4 per cent. The finance, retail trade, and construction sectors have an entry proportion that is close to the economy-wide all-industry average of 20.9 per cent. The community, business, and personal services sector is above this average. Finally, the primary sector has the lowest entry barriers with an entry proportion of 32.6 per cent.

In summary, the LEAP file shows that a substantial proportion of the labour force is reallocated annually as the result of firm decline and exit. When the economy is growing, some 8 to 9 per cent of all jobs are "lost" annually for the entire sample (see Table 4-6); some 7 to 8 per cent for manufacturing (Appendix Table C-4). An 8-per-cent decline rate, when accumulated over a five-year period, would imply that an industry would lose some 40 per cent of its jobs over the period. But the use of an annual rate to infer long-term change would be wrong. It presumes that all firms that decline in one year continue to do so. In reality, the output and employment of a portion of continuing firms fluctuate over time.

In order to examine the fifth question – whether the sources of job change over a longer period differ from the changes measured on a year-to-year basis – the status of firms and their employment were compared in 1978 and 1986. Then the percentage change in employment in each category for the entire period was recalculated by comparing the employment of firms in 1978 as opposed to 1986. The results are reported in Table 4-8, both in terms of gross percentage change and implicit annual rates.

For all industries, total job loss accounts for some 32.6 per cent of base-year employment – 14.4 per cent from contracting firms, 18.2 per cent from exits. The

Table 4-8

Source of Firm Job Gain and Loss, Derived from the LEAP File, by Sector, Canada, 1986 Compared to 1978

		Continuing firm									
		Expansion[2]		Contraction[3]		Firm entry[4]		Firm exit[5]			
	Employment in 1978[1] (1)	1978 to 1986 (2)	Implicit annual rate (3)	1978 to 1986 (4)	Implicit annual rate (5)	1978 to 1986 (6)	Implicit annual rate (7)	1978 to 1986 (8)	Implicit annual rate (9)	Exit/ gross job loss (10)	Entry/ gross job gain (11)
	(Thousands)					(Per cent)					
Primary	91.4	22.3	2.5	19.1	2.6	53.7	5.5	30.2	4.4	61.2	70.7
Mines, quarries, and oil wells	149.9	32.2	3.6	24.3	3.4	20.3	2.3	14.4	1.9	37.1	38.6
Manufacturing	2,067.3	18.1	2.1	16.3	2.2	13.9	1.6	15.9	2.1	49.3	43.4
Construction	445.8	23.9	2.7	20.2	2.8	40.7	4.4	35.9	5.4	64.0	63.0
Transportation, communications, and other utilities	863.8	11.8	1.4	22.7	3.2	9.7	1.2	8.4	1.1	26.9	45.2
Wholesale trade	506.7	28.3	3.2	15.5	2.1	27.5	3.1	27.1	3.9	63.6	49.2
Retail trade	1,080.4	33.6	3.7	12.8	1.7	32.8	3.6	22.2	3.1	63.5	49.4
Finance, insurance, and real estate	560.9	28.6	3.2	11.9	1.6	18.8	2.2	13.8	1.8	53.8	39.7
Community, business, and personal services	2,515.6	27.8	3.1	9.3	1.2	33.2	3.6	16.8	2.3	64.5	54.4
All industries	8,301.5	24.3	2.8	14.4	1.9	25.3	2.9	18.2	2.5	55.8	51.0

[1] See Appendix C or Statistics Canada (1988), pp. 11-8, for a definition of the employment concept.

[2] Increase in employment in firms that existed in both 1978 and 1986 and which had expanded employment in 1986 relative to 1978, as a percentage of 1978 employment.

[3] Decrease in employment in firms that existed in both 1978 and 1986 and which had decreased employment in 1986 relative to 1978, as a percentage of 1978 employment.

[4] Employment of firms in 1986 which were new since 1978, as a percentage of base-year employment.

[5] Employment of firms in 1978 that had exited by 1986, as a percentage of base-year employment.

SOURCE Special tabulations provided by Statistics Canada.

cumulative effect of contracting firms is much less than would be derived from annual rates of change (reported in Appendix Table C-1). Over an eight-year period, many firms that suffered declining employment in one year have turned their performance around or have exited. On the other hand, the annualized values of the longer-run exit rates are much closer to the annual rates calculated by comparing two adjacent years. They need not have been. If exits arise primarily because a fringe group of firms constantly enters and then exits almost immediately, job loss due to exits derived by comparing two years separated by a considerable period will tend to be less than the cumulated annual averages derived by examining each of the intervening years.[15,16]

Over the longer 1978-86 period, exits for most industries have become just as important as job loss in contracting firms. The birth and death process then becomes much more important in reallocating resources when short-run cyclical fluctuations are removed and trends in the intermediate to longer run are examined. Table 4-8 shows that the proportion of total job loss accounted for by exits (column 10) is 55.8 per cent, when 1986 firm status is compared to that in 1978 across all sectors. The proportion of total job gain accounted for by births is 51.0 per cent (column 11). The exit ratio can be used to rank industries by the extent to which closure, with its attendant higher adjustment costs, is more important. The previous conclusions, based on year-to-year comparisons, are not changed substantially when the longer period is used. The entry ratio measures the "openness" of the sector. Once again the relative rankings of different sectors produced by year-to-year changes are not changed markedly by the use of the longer period.

Ultimately specifying the annual turnover rate that might be expected to occur as part of the dynamics of a market economy is one object of this investigation. The average job-loss rate calculated from annual data for 1978-81 and 1983-86 for all sectors is 8.5 per cent (Table 4-6). The implicit annual compound rate derived using 1978 and 1986 as endpoints is only 4.4 per cent (Table 4-8). The difference between the two arises from the fact that not all of the variation in continuing firm employment is permanent. Some job change is temporary and may not lead to the reallocation of labour and other factor inputs.

Grey and Côté (1984, Table 2, p. 4) have examined whether fluctuations in firm employment lead to relocation of workers, by tracking employees who were laid off in 1975 and 1978. Of those laid off in 1975, 57.2 per cent of those in the manufacturing industries return to the same employer in the next employment spell; in 1978, this increases to 64.7 per cent. The proportion of laid-off workers who never return to the same employer is 34.5 and 28.7 per cent in each of these two years. While it is tempting to apply these percentages directly to the annual data on job reduction at the firm level to deduce the long-term effect, this would be inappropriate. A part of the total layoff rate may be seasonal and may not be caught in the interyear firm employment changes reported here.

Whether the short-run job-loss rate overstates the degree to which resources are naturally recycled, as the fortunes of various firms change over time, depends upon the extent to which short-run changes in firm fortunes lead to a permanent reallocation of labour. It is important, therefore, to distinguish between job change, which is being measured here, and worker turnover. Worker turnover will be considered at greater length in Chapter 6.

Job Turnover at the Establishment Level

The Dun and Bradstreet File

A second source, the Dun and Bradstreet (D&B) file, is available to measure the job-creation process for a set of sectors besides manufacturing. In contrast to the LEAP file, which uses a firm as the unit of measurement, the D&B data measure job gain and loss on an establishment basis. Studies done for the Department of Regional Industrial Expansion (DRIE, 1985, 1986*a*) have used the Dun and Bradstreet file to divide total job gains and losses in Canada into those accounted for by establishment births, deaths, expansions, and contractions. Births arise from new establishments being listed on the D&B file, deaths from their disappearance. Expansion and contraction are measured by changes in the employment of establishments that continue to be listed in the D&B file over the period.

The D&B data does not purport to be a comprehensive census. One of its functions is to supply financial data for the Dun and Bradstreet's credit-rating service and it is this service that provides one of the primary incentives for businesses to divulge information. The file, then, is more representative of those businesses that rely upon credit. By way of contrast, the LEAP file is developed from administrative records on the amount of paid employment and should be more comprehensive.

Table 4-9 provides a comparison of the coverage of the two data sets. The relevant standard in each case is the average monthly paid worker employment in the sector as reported by the Labour Force Survey – a random sample of the work force.[17] With the exception of the primary sector, the LEAP file has reasonably good coverage at the sectoral level. In contrast, the D&B file is much more uneven. A comparison of the two (column 3) shows that the D&B file does relatively well – except in the transport, finance, and services sectors.

There are, however, problems other than coverage with this database that should be noted. First, since there is a lag between the start-up of a new company and its listing on the Dun and Bradstreet file for credit-rating purposes, there may be an underreporting of births. In a study by Birch (1979, p. 11), based on the D&B data for the United States, no adjustment was made for this lag. Subsequently, Birch and McCracken (1983) provide information on the rate at which births in 1969 were absorbed into or captured by the D&B file. From this, they estimate blow-up factors to calculate births from the D&B new listings. These factors differ depending upon the length of time being used for study. They report (ibid., Table 7, p. 23) that, for the manufacturing sector, a factor of 2.1 should be used if two consecutive years of the D&B file are used and 1.6 for a five-year period. Similar algorithms do not appear to have been used for deaths (Johnson and Storey, 1985, pp. 37-9). The DRIE studies, based on the D&B file, make no correction for these lags, arguing that the longer period of eight years used makes this bias less important.[18]

Table 4-9

Comparison of the Coverage of the D&B File with the LEAP File for Eight Sectors, Canada, 1982

	Coverage ratio[1]		Coverage of the D&B file relative to the LEAP file (1)/(2) (3)
	D&B file (1)	LEAP file (2)	
	(Per cent)		
Primary	37.5	45.4	82.6
Mines, quarries, and oil wells	87.3	109.6	79.7
Manufacturing	87.4	105.5	82.8
Construction	87.5	84.9	103.1
Transportation, communications, and other utilities	49.9	97.1	51.4
Trade	81.8	107.5	76.1
Finance, insurance, and real estate	57.9	105.0	55.1
Community, business, and personal services	42.6	100.9	42.2
All industries[2]	64.7	101.2	63.9

1 Coverage ratio defined as employment in the given database relative to average monthly paid workers taken from the Labour Force Survey.

2 Excluding public administration.

SOURCE DRIE (1985), Table 111-1, p. 11, and Table 111-2A, p. 12; Statistics Canada (1983*b*), Table 76, p. 115; and special tabulations provided by Statistics Canada.

A second reason for the underreporting of births in the D&B file has been noted by both Birch (1979) and Johnson and Storey (1985). Branches of multi-establishment firms are poorly covered because, unlike subsidiaries that have lives of their own (credit ratings), branches are part of a central organization; it is data concerning the latter that has been of primary importance to Dun and Bradstreet. About 50 per cent of multi-establishment firms in the United States do not report disaggregated data for their branch establishments (Johnson and Storey, 1985, p. 17). Officials at DRIE note that in general the coverage of branches in the D&B file for Canada is even worse than in the file for the United States. Thus, new branches of multi-establishment firms and closures are probably underreported in the D&B data file for Canada.

A third problem with the Dun and Bradstreet data, as was the case with the LEAP file, arises because the effect of mergers is not excluded from the calculations of establishment births and deaths.[19] New establishment codes, which are defined as births, may simply be the result of a transfer of an establishment from one firm to another. This will have the effect of biasing the importance of births and deaths upwards and the continuing establishment growth and contraction rates downwards.

A fourth and related problem gives rise to the presumption that change arising from establishment births is overestimated relative to establishment expansion. A birth in the Dun and Bradstreet database occurs when a new locator number is assigned to an establishment. This can occur either because of the start-up of a new establishment or a change in its legal status. Birch (1979, p. 13) suggests the latter component is not large. However, both an unpublished study by the federal Department of Regional Industrial Expansion and work by Reynolds on the state of Minnesota, which used the

D&B files for Canada and the United States, respectively, suggest otherwise.[20] For example, the Canadian study found, based upon a telephone survey conducted in October 1986, that only 35 per cent of the business births in the sample it examined were really new. When weighted by the appropriate sampling ratio for different firm sizes, the study concludes that real births represented no more than 75 per cent of all business starts derived from the D&B file for the period 1974-82, as reported in DRIE (1986*a*). For the same reason, deaths are probably also overstated relative to establishment contraction.

Several other potential problems with the D&B data should be noted. First, Dun and Bradstreet tried to increase its coverage over time. Therefore, some births may be the result of this change. The D&B file for Canada, for example, did extend its coverage in the late 1970s (DRIE, 1986*a*, p. 7), which may result in inaccurate birth statistics. Second, Dun and Bradstreet updates its records infrequently. In the Canadian file, about one-third are updated annually. Over a three-to-four-year period, more than 85 per cent are updated. The longer period used in the DRIE studies should alleviate, but not remove, this problem. Third, Dun and Bradstreet purged its U.S. file between 1978 and 1980 of companies that did not respond to a special mailing (Johnson and Storey, 1985, p. 37). Officials at DRIE argue that no such large-scale purging has occurred for the Canadian file.

A Comparison of Job Turnover Based on the D&B File and the Census of Manufactures

Because of the possible biases in the Dun and Bradstreet file,[21] it is important to compare its results for manufacturing[22] to the correct measures developed in Chapter 3, before using it to examine the pattern of job growth and contraction across the economy as a whole.

Two comparisons with the Census of Manufactures estimates are possible. First, in the Baldwin and Gorecki (1983) study, which defined a firm or establishment death as a disappearance from a four-digit industry, total establishment exits (deaths plus divestitures) for the period 1970-79 accounted for 37.8 per cent of 1970 employment, on average, across 141 industries.[23] This is equivalent to an implicit annual decline rate of 5.1 per cent. If only establishment deaths are used, the rate is 2.3 per cent. Second, using the establishment database discussed in Chapter 3, the implicit annual exit rate for establishment deaths alone is 2.2 per cent for the period 1971-76; 2.1 per cent for 1976-81; and 2.1 per cent for 1971-81 (Table 3-9).

In comparison, the DRIE (1985, Table III-4B, p. 17) study calculated job loss due to establishment death for the eight-year period between 1974 and 1982 as 28.6 per cent of 1974 employment for manufacturing (for an implicit annual decline rate of 4.1 per cent per year). This is close to the exit rate calculated by Baldwin and Gorecki that includes divestitures – 5.1 per cent – and well above that calculated for establishment deaths alone – 2.1 to 2.3 per cent. Mergers then make up a much higher proportion of establishment deaths in the D&B file than in the LEAP file examined earlier (see Table 4-1).

The Dun and Bradstreet manufacturing birth rates are also high relative to the correct measures developed in Chapter 3, though here some caution must be exercised in drawing this conclusion. As with the exit-rate comparison, slightly different time periods are used for the entry-rate comparison. In the former case, this is less of a problem since exit rates are relatively constant over time. The situation differs, however, for entry rates.

With this caveat in mind, the Dun and Bradstreet implicit annual birth rate in manufacturing, for the period 1974-82, was 3.4 per cent, based on employment in 1974 (DRIE, 1985, Table III-4B, p. 17). When the disaggregated sample of 141 industries taken from the Census of Manufactures is used, a firm birth is defined as entry to a four-digit industry (rather than to manufacturing as a whole as in Chapter 3), which is counted as occurring both by establishment birth and acquisition; then the firm entry rate calculated from census data approaches that yielded by the D&B data. Entrants (new establishments plus acquisitions) between 1970 and 1979 accounted for, on average, 36.9 per cent of total 1979 employment across 141 industries (Table 3-1) – for an implicit annual rate of 3.6 per cent. But new establishments alone accounted for only 20.9 per cent of 1979 employment (an implicit rate of 2.7 per cent). The establishment panel discussed in Chapter 3 (Table 3-9) yields an implicit annual birth rate using base-year employment to calculate rates of change of 1.8 per cent for 1971-76, 2.0 per cent for 1976-81, and 1.8 per cent for 1971-81. When mergers are excluded, the correct entry rates are well below the D&B estimates. As with deaths, births in the Dun and Bradstreet base are overestimated because they apparently include mergers, and, as we have shown, the latter are significant in terms of the number of employees affected.

Table 4-10

Establishment Job Gain and Loss Rates, Derived from the D&B File, Manufacturing and All Sectors, Canada, 1974-82 and 1976-84[1]

	1974-82		1976-84	
	All sectors (1)	Manufacturing (2)	All sectors (3)	Manufacturing (4)
	(Percentage of base-year employment)			
Gross job gain	66.1	48.4	52.5	41.9
Birth	45.2	30.7	35.2	27.3
Expansion	20.9	17.7	17.3	14.6
Gross job loss	41.4	41.1	44.5	45.1
Death	28.4	28.6	31.8	32.2
Contraction	13.0	12.5	12.7	12.9

1 The DRIE studies essentially used Birch's (1979) definitions. A birth arises from a new establishment being listed on the Dun and Bradstreet file, a death from its disappearance. Expansion and contraction are measured by changes in employment of establishments that continue to be listed in the Dun and Bradstreeet file over the period. There is a slight difference in the definition of births in the two time periods. In the first, a birth is just a new establishment whose start year was within the analysis period. In the second, all branches which were new listings on the file are added. There is no start-up data attached to these records, but it was assumed a new listing meant a start.

Source DRIE (1985), Table III-4B, p. 17; and DRIE (1986a), Table III-4B, p. 19.

There is less of a difference in the D&B expansion and contraction rates of continuing establishments compared to the estimates developed in Chapter 3. However, comparisons must be made with care. It was shown in Chapter 3 that annual expansion and contraction rates differ markedly when they are calculated over different periods. In the longer run, declining firms either reverse their fortunes or exit. Thus longer-run decline closures are somewhat lower than short-run decline closures in the continuing sector. The reverse is true of expansion closures.

Over the eight-year period 1974-82, the D&B data show that contractions in continuing establishments accounted for 12.5 per cent of base-year employment in manufacturing, and expansions for 17.7 per cent – for implicit annual rates of 1.7 and 2.1 per cent, respectively (DRIE, 1985, Table III-4B, p. 17). The continuing establishment sample from the Census of Manufactures followed over the period 1971-81 yielded equivalent annual long-run contraction and expansion closures of 1.3 and 1.9 per cent, respectively (Table 3-9).

In conclusion, the Dun and Bradstreet data can be reconciled with the more comprehensive results derived from census records for the manufacturing sector reported in Chapter 3. In the D&B file, entry includes both establishment creation and acquisitions; exit, both establishment closures and divestiture. The same, no doubt, applies to the continuing segment, but the bias here is less substantial – probably because mergers in the continuing sector are less important than those that are connected with entry and exit (Table 3-1).[24] Nevertheless, since mergers often proceed in waves, any sudden surges may give problems to the conclusions drawn from the use of the D&B file.

The D&B establishment base on entrants and exits is useful in comparing not just the amount of job turnover created by establishment destruction and creation but also the amount of employment change that results from the changing identity of participants in the market. The latter includes mergers. If merger intensity varies across sectors, the birth and death data will do a poor job in comparing the intensity of job creation and destruction. On the other hand, it will reflect the extent to which change that includes mergers differs across sectors. The D&B data on job turnover in the continuing segment of manufacturing contain less bias and are therefore potentially more useful for cross-industry comparisons.

Job Turnover in the Manufacturing Sector Relative to Other Sectors

Table 4-10 summarizes the percentage change in employment in each establishment gain and loss category for the periods 1974-82 and 1976-84 based on the D&B data for Canada. The latter period includes the severe recession period of the early 1980s. Therefore, job losses are higher and job gains lower in the second period. It is worth reiterating once again that losses due to deaths include both establishment closure and transfer to new owners. The reverse is true for births.

A comparison of the results for the manufacturing sector to all sectors indicates that, in both cases, gross job losses amount to over 40 per cent of base-year employment for the eight-year periods covered. Overall contraction rates in the economy as a whole are about the same as in manufacturing, even though there was more net job creation in the former. The rate of job gain is greater for the economy as a whole than for manufacturing, reflecting a shift in employment opportunities. But the relative amount of job gain accounted for by births is quite similar at this level of aggregation. The similarity of exit rates, but not of entry rates, once more suggests adjustment comes mainly by variation in entry, and not in exit rates – even when transfers are included in both.

The DRIE studies provide further evidence to support the proposition that adjustment comes mainly from the entry side. Provincial job-gain and job-loss rates in manufacturing are presented in Table 4-11 for the 1974-82 period, with the provinces being ranked on the basis of provincial net employment growth. Death rates (establishment closures plus divestitures) fall in a range from 24 to 35 per cent; birth rates (openings plus acquisitions) from 20 to 63 per cent. Once again, the death rate is less variable than the entry rate – even though these rates include not only closures and openings but also mergers. The contraction rate in the continuing sector is also less variable than the expansion rate. Moreover, the death rate and the contraction rate do not steadily increase as growth rates decline. The net change in jobs in manufacturing varied substantially across provinces; but most of the variability is accounted for by differences in job-gain rates, not in job-loss rates.

The breakdown of the components of job change by sector using the D&B data is reported in Table 4-12. It differs from a similar breakdown based on the LEAP file, presented in Tables 4-6 and 4-7, which used firm rather than establishment employment change. Nevertheless, the impression about the relative volatility of different sectors drawn from the LEAP file exit rates (Table 4-6) is generally confirmed by the D&B file exit rates. Transportation has one of the lower rates of exit; the construction and the primary sectors (except for fishing), a relatively high rate. Trade is somewhat above the mean; manufacturing is a little below the trade sector. The only sector that changes position markedly when the D&B file, rather than the LEAP file, is used is mines. It has one of the lowest death rates when using the latter; one of the highest, when using the former. Because of the differences in the files discussed previously, this could be the result of either more mergers or more establishment closures by a continuing firm.

Conclusion

This chapter examined whether the observed pattern of job growth and job loss in manufacturing is unique. It is not. Gross job loss and gain are large everywhere relative to net changes in employment. In the short run, continuing firm expansion and contraction provide almost all of net employment change. In the longer run, the ratio of employment change due to births relative to

Table 4-11

Components of Employment Change in Manufacturing Establishments, Using the D&B File,[1] by Province,[2] Canada, 1982 Compared to 1974

	Birth (1)	Continuing establishment expansion (2)	Gross job gain (1) + (2) (3)	Death (4)	Continuing establishment contraction (5)	Gross job loss (4) + (5) (6)	Net employment change (3) – (6) (7)
				(Per cent)			
Newfoundland	63.3	18.4	81.7	31.4	8.8	40.2	41.5
Alberta	58.6	28.4	87.0	34.8	11.4	46.2	40.8
Saskatchewan	43.3	22.4	65.7	24.4	10.7	35.1	30.5
Prince Edward Island	50.6	19.0	69.6	29.4	14.9	44.3	25.3
British Columbia	41.4	22.4	63.5	29.9	10.1	40.0	23.7
Manitoba	28.7	18.7	47.4	27.0	11.0	38.0	9.4
Ontario	30.7	16.1	46.8	27.2	12.1	39.3	7.5
Nova Scotia	30.9	18.2	49.1	28.9	14.0	42.9	6.2
New Brunswick	19.7	23.7	43.4	27.3	13.5	40.8	2.5
Quebec	25.0	17.3	42.3	30.3	14.0	44.3	–1.9

1 A birth arises when a new establishment is listed on the Dun and Bradstreet file, a death from its disappearance. Expansion and contraction are measured by changes in employment of establishments that continue to be listed in the Dun and Bradstreet file over the period and expand and contract, respectively, their employment levels between the initial and terminal years.

2 Ranked by net employment growth (column 7).

Source DRIE (1985), Table C-7, n.p.

Table 4-12

Components of Job Gain and Loss of Establishments, Using the D&B File, by Sector, Canada, 1982 Compared to 1974

	Birth (1)	Continuing establishment expansion (2)	Death (3)	Continuing establishment contraction (4)	Net change[1] (5)	Birth/ gross job gain (6)	Death/ gross job loss (7)
				(Per cent)			
Agriculture	54.5	29.1	24.6	14.5	44.5	65.2	62.9
Forestry	47.7	21.7	32.1	18.0	19.3	68.7	64.1
Fishing	53.0	26.4	17.3	24.8	37.3	66.8	41.1
Mines, quarries, and oil wells	75.7	19.4	31.8	10.8	52.5	79.6	74.6
Manufacturing	30.7	17.7	28.6	12.5	7.3	63.4	69.6
Construction	47.2	20.8	33.2	20.1	14.7	69.4	62.3
Transportation, communications, and other utilities	45.8	29.3	21.3	17.2	36.6	61.0	55.3
Trade	44.7	19.1	30.8	11.4	21.6	70.1	73.0
Finance, insurance, and real estate	68.7	24.8	28.5	15.4	49.6	73.5	64.9
Community, business, and personal services	61.5	25.0	24.8	10.7	51.0	71.1	69.9
All industries	45.2	20.9	28.4	13.0	24.7	68.4	68.6
Standard error of mean	4.10	1.32	1.64	1.45	...	1.67	3.10

1 Net change is columns 1 and 2 minus columns 3 and 4.

SOURCE DRIE (1985), Table III-4B, p. 17.

relative to net changes in employment. In the short run, continuing firm expansion and contraction provide almost all of net employment change. In the longer run, the ratio of employment change due to births relative to gross job gain increases; so does employment change from deaths relative to gross job loss. Finally, adjustment occurs more on the entry and expansion side than on the death and contraction side. While these general conclusions emerge from the data, examination of the results do show differences across sectors.[25] Manufacturing, however, shows neither the least nor the most job turnover.

5 Job Turnover in Other Countries

A comparison of job turnover in Canada with that in other countries serves to indicate whether the Canadian experience is unique. If similar patterns of growth and decline can be found in other countries, then the conclusions drawn previously about observed adjustment patterns in Canada are strengthened. Equally, differences in the patterns may reveal inherent advantages or disadvantages in the adjustment process in Canada.

In the following sections, the job-turnover experience of, first, the United States, then France, West Germany, Sweden, and Japan, and, finally, the United Kingdom is examined. Questions are posed similar to those investigated with respect to the Canadian data. How large are growth and decline relative to net employment change? Are exit and decline rates relatively constant? Does adjustment occur more on the entry than on the exit side?

In examining the job-turnover experience of other countries, considerable attention is paid to the underlying data and methodology. Intercountry comparisons will inevitably be made. An understanding of the approach and data used in each national study will provide guidance as to which comparisons are appropriate and which are inappropriate.

Although there are differences between the job-turnover process in Canada and in these other countries – not surprising in view of differences in labour laws, economic structure, institutions, attitudes towards work, and data sources – it is the similarities that are much more striking. Many of the broad generalizations to emerge from Chapters 3 and 4 for Canada are also found for the other advanced market economies studied here.

It should be noted that the focus of the discussion at this juncture in the study is on the job-turnover process, not the relative performance of different national economies in terms of net job growth. There is, however, no inconsistency with a finding of considerable intercountry similarity in job-generation patterns, yet different country net job-growth records. One of the themes to emerge from the discussion, for example, is that different economies, regions, and industries tend to change size not so much by variations in job loss but rather by variations in job gain. Thus the same pattern of change is found in the various countries even though job-growth rates differ.

United States

Several different sources of data are available to evaluate the job-turnover process in the United States. Each source has its own strengths and weaknesses; but together they indicate that firm turnover and employment change are substantial.

Early work was done on U.S. firm entry and exit at the Department of Commerce (see Churchill and Foss, 1949; Churchill, 1954*a*, 1954*b*, 1959*a*, 1959*b*). New, discontinued, and transferred businesses as well as the total business population were reported annually over the postwar period up to 1961. Based on tax, census, and social security administrative files, the series, as of 1959, covers firms accounting for 85 per cent of private-sector employment, excluding agriculture and the professions. Its major deficiency, for the purposes of this study, is its failure to measure the employment effects associated with entry and exit. Nevertheless, one finding emerges that is particularly important: the new business-formation rate is sensitive to the definition of a new business used.

The Department of Commerce studies defined firms as legal entities. New businesses included only firms newly established and not those acquired. Discontinued businesses included closures of all kinds without reference to the reason for going out of business. A continuing firm that had a change in ownership was counted as a business transfer. Transfers also included partnerships in which a member was added or dropped; corporations that were reorganized and reincorporated; businesses sold to, or otherwise acquired by, new owners; and firms that had undergone a change in legal form of organization, such as a change from a partnership to a corporation.

The Department of Commerce data show that entry was substantial when measured in terms of the number of firms. Over the period 1949-61, the new business-formation rate was 8.9 per cent across all industries; the average discontinuance rate, 7.5 per cent. What is significant is the average transfer rate at 9.2 per cent. Any study of the job-turnover process that cannot distinguish real births from corporate changes will contain substantial biases, as the data reported in Chapter 3 also indicated.

While the Department of Commerce studies focused on the number of entrants and exits, more recent U.S. work has focused on employment change associated with growth and decline in firms and establishments. These job-turnover studies can be divided into several groups, depending upon the data source used: the Dun and Bradstreet file, unemployment insurance records, and Census of Manufactures data. Each is considered separately here. While these studies improve upon those by the Department of Commerce in that employment changes rather than firm numbers were used to measure turnover, they occasionally suffer in a different regard. They do not always distinguish between births and changes in the legal form of an organization or the identity of the owner.

The Dun and Bradstreet File

Perhaps the most extensive and certainly most well-known set of studies on job turnover in the United States are those of Birch (1979, 1981, 1987), based on the Dun and Bradstreet (D&B) computerized records on firm and establishment employment. Considerable attention has already been devoted to the D&B data in Chapter 4. Although that discussion referred to job turnover in Canada, many of the same deficiencies exist in the D&B data for the United States.

Some of Birch's findings on job turnover are summarized in Table 5-1. Job gain includes new establishments and continuing establishment expansions; job loss includes establishment exits and continuing establishment contractions. Three separate short periods from the 1970s are used. The data are tabulated on the basis of the employment growth rates of the states in which the establishments were located.

Over the short periods used by Birch, national job-loss rates for the entire sample vary from 7.2 to 9.2 per cent

Table 5-1

Annual Rate of Establishment Job Gain and Loss across the United States,[1] Classified by State Growth Rate,[2] Selected Periods, 1969-76

	State growth rate				
	Fast	Moderate	Slow	Declining	U.S. average
			(Per cent)		
1969-72					
Job gain[3]	13.8	10.9	8.5	7.5	10.4
Job loss[4]	8.3	8.0	7.7	8.4	8.1
Net	5.5	2.9	0.8	–0.9	2.3
1972-74					
Job gain	12.4	10.1	9.0	–	10.9
Job loss	7.2	7.2	7.6	–	7.2
Net	5.2	2.9	1.4	–	3.7
1974-76					
Job gain	15.1	11.4	10.7	8.3	11.2
Job loss	8.9	8.7	9.7	9.3	9.2
Net	6.2	2.7	1.0	–1.0	2.0

1 For farming, manufacturing, other, trade, and service secors as covered by the Dun and Bradstreet file, see Birch (1979) for a discussion of coverage. Employment includes both wage and salaried workers. Rates are calculated relative to base-year employment.

2 The four classes of employment change are: fast (over 4 per cent per year); moderate (2 to 4 per cent per year); slow (0 to 2 per cent per year); and declining (negative growth). Birch (1979) notes this breaks the number of states into four roughly equal groups.

3 Gain results from the formation of a new establishment, an increase in the number of employees of an existing establishment, or a movement into a state by a firm previously located elsewhere.

4 Loss arises from the dissolution of an existing establishnent, a decrease in the number of employees in an existing establishment, or outmigration from a state.

Source Birch (1981), Table 1, p. 5.

annually. The lowest rate occurs between 1972 and 1974. Job-loss rates do respond, but only slightly, to the differences in economic conditions that occurred in the early 1970s. If job-loss and job-gain rates are compared across growth classes within time periods, contraction rates are relatively constant compared to expansion rates. As with the Baldwin and Gorecki (1983) study, the overall job-loss rates reported for the United States do not vary as much as do job-gain rates. If just establishment birth and exit rates are used in examining job turnover, the same conclusion holds for the period 1969-76.[1] Armington and Odle (1982, p. 16) conducted a study similar to that of Birch, but for 1978 to 1980, and concluded:

> Rates of loss of employment were quite constant across regions, for both large and small businesses, from both deaths and contractions. They rarely varied as much as a single percentage point from the small-business loss rate of 14 per cent or the large-business loss rate of 12.8 per cent. Thus the variations in regional net employment change rates were due principally to differences in rates of birth and expansion.

The components of job gain and loss are also detailed by Birch (1979); but the results should be treated cautiously because of the biases in the Dun and Bradstreet data. Births and deaths are probably overstated because they include mergers. The change in continuing establishments, at least over short periods, is probably underestimated since the D&B database has a large percentage of establishments that report no change in employment.[2] It is likely, then, that the birth and death process is overstated relative to expansion and contraction in the Birch study.[3]

Keeping this bias in mind, Table 5-2 presents data on the relative importance of two components of job gain and loss. On the job-gain side, Birch's data show that establishment openings are more important than establishment expansions, while establishment closures are more important than establishment contractions. The relative importance of openings and closures increases with the longer period 1981-85 compared to the earlier two-year periods – a result consistent with the findings of Chapter 3.[4]

Table 5-2

Annual Rate of Establishment Job Gain and Loss in the United States, Selected Periods, 1969-85[1]

	Job gain		Job loss	
	Birth	Expansion	Death	Contraction
	(Per cent)			
1969-72	5.6	4.7	5.2	2.9
1972-74	5.5	5.3	4.5	2.6
1974-76	6.7	4.4	5.7	3.4
1981-85	5.2	3.0	5.8	2.3

[1] For definitions of job gain and loss, see Table 5-1. The table uses the Dun and Bradstreet data. The job gain and loss rates for 1981-85 were estimated from data provided by Birch (1987).

SOURCE Birch (1979), Table 3-1, p. 22; and Birch (1987), p. 12, Tables 1-3 and 1-4, pp. 14-5.

The Unemployment Insurance Records

Recently, two studies of job turnover were conducted using data collected as part of the administration of the U.S. unemployment insurance (UI) program. Leonard (1987) examined turnover for Wisconsin between 1977 and 1982. Jacobson (1986) did the same for Pennsylvania for the period 1975-85 as part of an OECD (1987) project. Both studies used unemployment insurance records that cover the private nonagricultural sector. In these studies, births arise when a new identifier number is assigned by the administrators of the UI system. This occurs when an employee, subject to unemployment insurance, is first recorded. Annual employment, including part-time workers, is measured as average monthly employment but excludes months where zero employment was recorded (OECD, 1987, p. 208).

Although the UI data is essentially establishment-based, mergers can result in the issuance of a new identifier and the removal of an existing one. Leonard (1987, p. 162, footnote 6) reports the results of a study for Wisconsin for 1978-81 that documents this bias in job gain and loss. For job gain, the UI-based data, for example, is 3 percentage points too high. This is 27 per cent of the gross job gain – probably even more for entry. Moreover, as the commentary on the Canadian data in Chapter 3 suggests, merger intensity varies considerably over time. Therefore, conclusions based on the 1978-81 period for Wisconsin may have limited applicability. In other words, UI records as a source of job-turnover data are likely to suffer, in general, the same type of problems as the D&B data on the ownership question.

The rates of job change due to establishment growth (birth and expansion) and decline (death and contraction) for Wisconsin are presented in Table 5-3. Job gain and loss are substantial relative to net employment change for both manufacturing and nonmanufacturing

Table 5-3

Annual Rate of Establishment Job Gain and Loss, Wisconsin, 1978-82[1]

	All sectors			Nonmanufacturing sector		Manufacturing sector	
	Job gain	Job loss	Net change	Job gain	Job loss	Job gain	Job loss
				(Per cent)			
1978	17.2	7.3	9.9	19.0	8.4	14.0	5.4
1979	12.6	8.9	3.6	14.0	11.0	11.0	5.7
1980	11.9	10.5	1.4	13.0	12.0	10.0	8.2
1981	9.1	12.6	-3.5	11.0	14.0	5.5	11.0
1982	18.2	15.8	2.4	17.0	16.0	20.0	15.0

1 Percentages are calculated on base-year employment of the previous year for the respective sectors. Job gain is calculated from establishment birth and expansion; job loss from establishment closure plus contraction. Establishment birth and death because of mergers are included in the calculations. The data source is unemployment insurance records.

SOURCE Leonard (1987), Table 6.5, p. 148, and Table 6.6, p. 150.

sectors. The job-gain rate has greater variability than the job-loss rate in both sectors. Prior to the recession of 1981-82, job loss is relatively stable – a phenomenon that is also found in Canada (see Chapters 3 and 4).

Jacobson's study (1986) of Pennsylvania between 1975 and 1985 also yields high rates of employment gain and loss (Table 5-4). The mean annual gain rate is 13.2 per cent. The mean annual loss rate is 12.5 per cent. Exit rates are more stable than entry rates. Nevertheless, both are much less variable than growth and decline in the continuing segment. In the latter, contraction is more variable than expansion.[5] The same results were also found for Canada.

The two UI-based studies show the same pattern of greater volatility of job gain than job loss that was evident in the Birch studies based on the D&B file. The

Table 5-4

Annual Rate of Establishment Job Gain and Loss, Pennsylvania, 1976-85[1]

	Establishment birth (1)	Continuing establishment expansion (2)	Gross job gain (1) + (2) (3)	Establishment death (4)	Continuing establishment contraction (5)	Gross job loss (4) + (5) (6)	Net growth (3) – (6) (7)
				(Per cent)			
1976	7.4	7.0	14.4	5.9	6.2	12.1	2.3
1977	6.1	7.2	13.3	6.0	6.1	12.1	1.2
1978	6.3	7.7	14.0	4.7	5.4	10.0	4.0
1979	5.6	7.4	13.0	5.0	5.8	10.8	2.1
1980	4.8	6.1	10.9	5.1	7.9	13.1	-2.2
1981	5.4	6.2	11.6	4.8	7.4	12.2	-0.6
1982	5.8	5.8	11.6	5.9	9.9	15.8	-4.2
1983	5.0	6.8	11.8	6.2	8.4	14.6	-2.8
1984	6.4	8.7	15.1	5.0	6.2	11.1	4.0
1985	8.3	7.7	16.0	6.0	6.8	12.8	3.2
Mean	6.1	7.1	13.2	5.4	7.0	12.5	0.7
Standard error of mean	0.34	0.28	0.53	0.19	0.44	0.54	0.93

1 The source is the state unemployment insurance files. See text for further discussion. Rates are calculated on the employment of the previous year. Figures may not add up because of rounding.

SOURCE Jacobson (1986), Table 2, p. 6.

absolute values of the gain and loss rates are slightly higher than in the latter, but differences in time periods and spans used make comparison difficult.[6]

The percentage of total job gain and loss accounted for by births and deaths is lower in Jacobson's study of Pennsylvania than that given by Birch.[7] Nevertheless, it is still higher than for Canada when births are defined as new establishments. But here too, it is difficult to compare the results. Since both the D&B and UI data have some mergers counted as entry and exit, this would tend to inflate their estimate of the importance of births in the total expansion process.[8] When mergers are excluded from the UI data for Wisconsin, the percentage of total job gain due to births in the period 1978-81 is 18 per cent; for job loss, deaths account for 11 per cent.[9] These proportions are much closer to those reported for Canada.

The Census of Manufactures

The work most comparable to that reported in Chapter 3 is that of Dunne et al. (1989), which uses the U.S. Census of Manufactures data for the census years 1963, 1967, 1972, 1977, and 1982.[10] Employment change is divided into components associated with establishment births, expansions, deaths, and contractions. The results are presented in Table 5-5. Panel A of the table presents the total rate of change over the intercensus periods; panel B, the implicit annualized rates of change. As was the case for Canada, cumulative job loss is substantial. In the first period, employment grew rapidly. No two-digit industry suffered an employment decline. Yet total job loss was some 19 per cent. Subsequent intercensus periods had either negative or much lower growth rates. The rates of total job loss in each period varied from 27 to 33 per cent.

Table 5-5

Components of Job Gain and Loss in Manufacturing Establishments,[1] Measured over Four- and Five-Year Periods, United States, 1963-82[2]

		Components of job change					
	Change in total employment (1)	Establishment birth (2)	Continuing establishment expansion (3)	Gross job gain (2) + (3) (4)	Establishment death (5)	Continuing establishment contraction (6)	Gross job loss (5) + (6) (7)
				(Per cent)			
Panel A							
Percentage over period:							
1963-67	14.5	14.1	19.4	33.5	11.1	7.8	18.9
1967-72	–2.7	19.6	10.6	30.2	18.9	14.0	32.9
1972-77	2.7	15.8	13.6	29.4	15.3	11.3	26.6
1977-82	–3.8	17.6	11.7	29.3	17.7	15.4	33.0
Panel B							
Implicit annual compound rate of change:							
1963-67	3.39	3.35	4.53	7.49	2.90	2.00	5.10
1967-72	–0.53	3.64	2.04	5.42	4.10	2.97	7.67
1972-77	0.50	2.98	2.58	5.29	3.27	2.37	5.99
1977-82	–0.75	3.24	2.24	5.27	3.82	3.29	7.70

1 Establishments with five or more employees.
2 Rates are calculated on base-year employment.
SOURCE Dunne et al. (1989), Table 1, p. 55.

The implicit annual job-loss rates calculated from these cumulative loss rates vary from 5.1 to 7.7 per cent; the implicit annual gain rates from 5.3 to 7.5 per cent. These are lower than those derived from the year-to-year comparisons based on the UI file and those based on the D&B data in Birch (1979). But the evidence for Canada indicates this is to be expected because of the longer period used for the U.S. census estimates. The cumulative five-year decline rates in the 1970s are somewhat higher than the five-year rates reported for Canada – 20 to 21 per cent using establishment data and 20 to 26 per cent using firm data. For the United States, the birth/expansion and death/contraction ratios are higher than for Canada in the 1970s (Table 3-9). This suggests that the United States does indeed have a higher percentage of total job gain accounted for by establishment entry and a higher percentage of total job loss accounted for by establishment exit.[11]

Dunne et al. (1989, Table 3, p. 59), like Birch (1981), discussed the job-turnover process by region. Unlike the four categories used by Birch (see Table 5-1), Dunne et al. used only two – expanding and contracting – with the U.S. divided into nine regions. As with Birch, a similar conclusion emerges. Variation in net entry rates comes primarily from variation in job-gain rates rather than job-loss rates.

France, West Germany, Sweden, and Japan

Recent work by the OECD (1987) allows the Canadian experience to be compared to three West European countries – France, West Germany, and Sweden – as well as Japan. The components of employment change, measured at the establishment level, for all sectors are available annually for as long as five years in the case of France and Germany. The data for these studies are derived from comprehensive administrative records. While each data source is briefly detailed here, full details may be found in OECD (1987, Note B, pp. 206-9).

The Data

The data statistics on employment change for *France* are derived from unemployment insurance files. These files measure entry from the time an establishment first reports an employee with a salary eligible for unemployment insurance. This could be after the creation of an establishment if independent or self-employed workers are used at first. Coverage is about 70 per cent of employment.

The *German* data come from statistics collected for the social insurance system. A birth occurs when an establishment first reports a person subject to the system of social insurance. Employees who work less than 15 hours per week (20 before 1979) and/or earn less than a certain amount are excluded. The sample covers 80 per cent of employment. While the data are establishment-based, establishments are sometimes grouped by industrial sector and community. Moreover, when ownership changes, an establishment may or may not be listed as a death and a birth. Preliminary analysis by the statistical group that collects the German data indicates this component is not insignificant.

The *Swedish* data for both firms and establishments come from business registration material kept by the Swedish Central Statistics Office. This register covers all employers in the country (self-employees are excluded). The number of employees is estimated from total hours worked per establishment, and the normal annual work-hours for full-time employees for 1977-82 and thereafter is estimated from income-tax data. Establishments are linked to enterprises, but, like the Canadian Census of Manufactures, the establishment identifier remains the same while the firm identifier can change because of mergers. Thus the establishment data used by the OECD is not troubled by ownership changes.

The *Japanese* data come from two sources. For continuing firms, a sample is drawn for firms with at least five "regular" employees (those who receive a wage and have an employment contract longer than one month). The population from which the sample is drawn accounts for about 70 per cent of employment of those establishments having at least five employees, but it covers only 50 per cent of total employment. The Japanese birth and death data come from establishment censuses that are done every three years and specifically ask an establishment its year of birth. These censuses cover all sectors except agriculture, forestry, hunting, and fishing.

Components of Job Change

The components of employment change for the selected OECD countries, along with a comparison to Canada, are presented in Table 5-6. West Germany, in contrast to France and Sweden, has a positive rate of annual net employment change; nevertheless, the rate of gross job loss is still very high (8.2 per cent). France and Sweden have a higher rate of gross job loss, but higher

Table 5-6

Components of the Change in Establishment Job Gain and Loss, Selected Countries,[1] Average of Annual Changes,[2] 1978-84

	Canada, 1978-84[3]	France, 1978-84[4]	Germany, 1978-84[4]	Sweden, 1982-84	Japan[5]
			(Per cent)		
Gross job gain	11.1	11.4	8.3	11.4	...
Birth	2.4	5.6	2.7	2.6	6.4
Expansion	8.7	5.7	5.6	8.8	4.1
Gross job loss	9.7	12.0	8.2	12.1	...
Closure	2.2	5.7	2.1	3.4	3.3
Contraction	7.5	6.2	6.1	8.7	3.6
Net employment change[6]	1.4	–0.6	0.1	–0.8	...

1 The coverage of the economies included varies country by country. See OECD (1987).

2 The rates are the ratio of the average yearly change divided by average employment. For Canada the rates are not those in OECD (1987), but rather those using the latest LEAP file. This makes little difference with either no change taking place or a maximum of 0.3 of a percentage point.

3 The data except for Canada uses establishments. Canadian data are derived from firm records used by the LEAP file. As was discussed previously in Chapter 4, these records produce rates of employment change that correspond closely to establishment rates for the continuing segment, and entry and exit rates that closely match firm entry via establishment opening and firm exit via establishment closure, respectively.

4 The year 1980 is excluded.

5 For Japan, the birth and closure rates are annual averages calculated for the periods 1970-72, 1973-75, 1976-78, 1978-81; the expansion and contraction rates are averages for 1982 and 1984. Therefore the two are not added to provide estimates of gross job gain and loss.

6 Net employment change = gross job gain – gross job loss.

SOURCE OECD (1987), Table 4.1, p. 101, and Table 4.5, p. 106.

rates of gross job gain, indicative of more labour-force churning.

It was observed previously that, for Canada, the establishment entry and exit process was less important than for the United States in contributing to total job gain and loss. Canada's situation appears to be the case for Germany and Sweden. France has a higher proportion of job gain accounted for by births than Canada, Germany, or Sweden.[12]

The Japanese data are the least comparable to those of other countries. Entry and exit rates are annual averages of data for three-year periods from 1970 to 1981, which give them a downward bias relative to other countries. Rates of entry are higher than for the other countries, but exit rates are not. The Japanese system has no less tendency to close establishments. It does, however, appear to have lower contraction and expansion rates in continuing firms – although care must be exercised with this conclusion because of the limited coverage of the data. If this result can be generalized, it indicates that less labour-force turnover may exist in Japan, not because there is a lower failure rate, but because the continuing segment does less churning. This result is consistent with the view that there is a solid core of companies with lifetime employees in Japan and a group of suppliers that essentially bear the brunt of cyclical changes in demand.

The OECD examined the reasons for differences in the job-turnover rates between Germany and France. Structural differences were examined first. As detailed in Chapter 4, job-loss rates differ substantially across sectors. The OECD (1987, p. 108) reported that only about 20 per cent of the higher job-turnover rate in France as compared to Germany could be explained by structural differences. The other factor examined was the difference in average establishment sizes in the two countries. Job turnover was found to be much higher in small establishments, and German establishments on average were larger than French establishments. About 40 per cent of the difference between the French and German performance was attributed to this difference in average establishment size.

The OECD (1987, pp. 103-6) also examined whether the entry and exit rates differed in terms of volatility. They were found to be similar. However, there are two serious problems with the data used. First, the Canadian, U.S., and German data include mergers. As noted in Chapter 3, there is considerably more instability for enterprise exits that include mergers than for establishment data. Second, the OECD used data that include the recession of the early 1980s. Canadian exit rates also go up dramatically in this period; though they are relatively stable for other years.

Two other pertinent observations can be drawn from the background data prepared for the OECD. The first pertains to the transitory component of change. The second deals with the difference between change measured in the short, as opposed to the longer, run.

A number of studies show that growth and decline have a large transitory component. Birch (1981, 1987) observes for his sample of U.S. firms that growth rates are negatively correlated over time. Leonard (1987) reports a similar finding for Wisconsin, but he points out that, while growth rates one year apart are negatively and significantly correlated, those for more than one year apart are virtually uncorrelated. In addition, Leonard indicates that part of the size differences is transitory. Large establishments have recently grown and will soon shrink. Small establishments have recently declined in size but, on average, will grow again.

The same database used by the OECD was recently used to examine the extent to which reversals in fortunes of establishments quickly occur in France (Madinier, 1986). Establishments that grew or declined in 1982 were divided into four categories based on their 1983 performance: those closed, those with an increase in employment, those experiencing a decrease in employment, and those with stable employment (see Table 5-7). The percentage of establishments declining in 1983 is higher for those that had increased employment in the previous year than for those that had decreased employment. The reverse is true for the percentage that had increased employment. This is indicative of short-run reversals in establishment fortunes. This should not, however, be interpreted to mean there is no secular decline. The percentage of those that declined in 1982 and that closed in 1983 is higher than for those that grew.

Madinier also shows that it is the most rapidly growing establishments in 1982 that declined in the next year. The mean growth rate in 1982 for those establishments that grew in 1982 and in 1983 was 14.7 per cent; but the rate for those that declined in 1983 was 15.6 per cent. The reverse holds for those that declined in 1982. The decline rate in 1982 for those that grew in 1983 was 14.3 per cent; but for those that subsequently declined in 1983, the rate was 10.9 per cent.

Table 5-7

Distribution of Establishments[1] in 1983 that Grew or Declined in Employment in 1982, France

	Establishment distribution in 1983			
	Closed	Increased employment	Decreased employment	Stable employment
	(Per cent)			
Increased in 1982	6.2	24.4	37.6	31.6
Decreased in 1982	10.3	30.5	23.5	35.7

1 Excludes public administration, local cooperatives, and large state-run enterprises.

SOURCE Madinier (1986), Table VII, p. 79, and Table IX, p. 81.

In Chapter 3, it was shown that the annual rates of job change differ quite markedly when measured on a year-to-year basis as opposed to a longer period. In the long run, a large percentage of the year-to-year change in continuing firms was reversed. The implicit annual rate of change in the longer run, then, is much smaller. Using establishment data for the manufacturing sector, it was found that annual rates of contraction, when measured on a year-to-year basis, averaged about 6.5 per cent between 1971 and 1981; exit rates averaged 1.8 per cent. However, when the years 1971 and 1981 were chosen to measure establishment status, the implicit contraction rate fell to 1.3 per cent; the exit rate stayed about the same at 2.1 per cent (Table 3-9).

Data is available on the rates of job change in Germany from 1977 to 1985, which allow comparison of short- and longer-term entry and exit rates (see Table 5-8). The mean rate of decline using year-to-year data was 6.2 per cent; but for the longer period from 1977 to 1985, it was 1.8 per cent. The mean of the year-to-year exit rates was 2.3 per cent. The implicit annual exit rate over the 1977-85 period was 2.4 per cent. The German data, then, exhibit very similar characteristics to the Canadian data in both the short and long run.

United Kingdom

A large number of studies have dealt with job loss and gain in the United Kingdom. These studies used a variety of data sources: incorporations, business name registrations, the Department of Industry's record of enterprises new to manufacturing, value-added tax registrations, county council files, employee registers held by

Table 5-8

Components of Economy-Wide Job Change Derived from Establishment Data, Germany, 1977-85[1]

	Continuing segment				
	Expanding	Declining	Entry	Exit	Net gain
			(Per cent)		
Year-to-year change:					
1977-78	6.32	5.92	3.64	2.91	1.1
1978-79	6.87	5.22	2.89	2.08	2.5
1979-80	6.36	5.1[illegible]	2.79	2.00	2.0
1980-81	5.30	6.[illegible]	2.77	2.05	–0.6
1981-82	5.18	7.2[illegible]	2.69	2.53	–1.9
1982-83	4.80	6.77	2.31	2.07	–1.7
1983-84	5.53	6.60	2.90	2.38	–0.5
1984-85	6.92	5.65	2.70	2.33	1.6
Mean	5.91	6.16	2.84	2.29	...
Standard error of the mean	0.29	0.28	0.13	0.11	...
Coefficient of variation	0.137	0.127	0.132	0.136	...
Long-run change:					
1977-81	12.08	9.53	11.72	9.27	5.0
1981-85	9.33	11.68	9.27	9.50	–2.6
1977-85	14.05	13.57	19.45	17.65	2.3
Implicit annual compound rate of change:					
1977-81	2.89	2.47	2.81	2.40	...
1981-85	2.26	3.06	2.24	2.46	...
1977-85	1.66	1.81	2.25	2.40	...

[1] These data exclude agriculture, postal service, railways, territorial authorities, and social security. Rates of change are calculated relative to total base-year employment.

SOURCE Cramer (1987), various tables.

the Department of Employment, the Factory Inspectorate, and the Dun and Bradstreet file. Except for the latter, those that count the number of entries and exits and also measure employment effects have had to merge different data sources. Nevertheless, despite the variety of data sources, valid comparisons between Canadian and U.K. patterns and components of job change can be usefully made.

Perhaps the most comprehensive estimates of firm births and deaths come from the value-added tax (VAT) administrative data. Registration is obligatory for all but a small number of firms (Johnson, 1986, p. 49). A VAT number may be issued to a legal entity that is a subsidiary of a company already possessing an identification number, so that birth and death statistics reflect corporate entities. The average VAT birth rate was 12 per cent over the period 1980-85; the average VAT death rate, 11 per cent.[13] These are broadly similar to the business-formation and -dissolution rates reported for the United States[14] and also to those for Canada derived from the LEAP file when the smallest-size class is omitted from the latter (Table 4-2).

In the remainder of this section, a small number of studies of job growth and decline in a particular region are discussed and reviewed.[15] This reflects the focus of much of the U.K. literature on job turnover. Attention is paid first to establishment-based job-change studies, then to those that use the firm as the unit of observation.

Components of Job Change

A comprehensive study of the birth, death, expansion, and contraction process for establishments in the manufacturing sector was done for three counties in Northern England – Tyne and Wear, Durham, and Cleveland – by Storey (1985). Data from county council, the Factory Inspectorate, and the Annual Census of Employment were used. The study compared establishment employment in 1978 to that in 1965. The components of job change for these counties are presented in Table 5-9. Over the 13-year period, some 13 per cent of all manufacturing jobs were lost. Although one of the three counties (Durham) had a net gain and the other two a net loss, the gross job losses were quite similar across the geographic regions – a result that, as Storey pointed out, is similar to that found by Birch (1979).

The implicit average annual closure rate between 1965 and 1978 was 1.3 per cent. The establishment closure rate in Canada, using employment calculated for each year from 1971 to 1981, averaged 1.9 per cent (Table 3-4). When establishment status in 1981 is compared to that in 1971, the implicit annual closure rate in Canada was 2 per cent (Table 3-9). Despite the higher levels of job loss in England, the closure rate was not higher than in Canada.

Cross (1981) studied long-term job gain and loss using manufacturing establishment data for Scotland.[16] Employment change was measured by comparing establishment status in 1977 to that in 1968. The database was built from a registry kept by the Scottish council (Development and Industry) supplemented by surveys, the Annual Census of Employment records, and the redundancy records of the Department of Employment. The components of job change derived by this study are presented in Table 5-10.

During the period 1968-77, Scotland experienced a substantial net job loss of about 15 per cent of 1968 employment. Gross job loss was much larger at 35 per cent and was about equally split between establishment closure and contraction. By way of comparison, establishment deaths accounted for about 60 per cent of total job loss in Canada when establishment status in 1981 was compared to that in 1971. In Scotland, the implicit annual closure rate of establishments was 1.8 per cent, which is similar to the Canadian rate of 2 per cent for the 1971-81 comparison. Cross also investigated the distribution of new establishment employment created by new firms and branches or subsidiaries. Less than 13 per cent of total job growth was provided by the latter (Cross, 1981, Table 4.5, p. 50). New firms alone over the period 1968-77 accounted for less than 3 per cent of 1977 employment (ibid., Table 4.1, p. 47).

Another extensive U.K. study was done by Fothergill and Gudgin (1982) for the East Midlands. This region, in contrast to Scotland and the north counties, expe-

Table 5-9

Components of Job Gain and Loss in Manufacturing Establishments, Northern England, 1965-78

	Job gain		Job loss		Gross job gain	Gross job loss
	Opening[1]	Expansion[2]	Closure[3]	Contraction[4]		
			(Percentage of 1965 employment)			
All establishments						
Durham	29.3	23.2	19.1	19.0	52.5	38.1
Cleveland	12.4	4.4	12.7	28.2	16.9	40.9
Tyne and Wear	11.4	10.6	15.4	22.7	22.0	38.1
All counties	14.8	10.9	15.3	23.7	25.7	39.0
Independent single-establishment firm[5]	2.8	2.3	3.6	2.1	5.1	5.8

[1] Employment in 1978 in establishments not in the county in 1965.
[2] Establishments in the county in 1965 and in 1978 that increased employment between those dates.
[3] Employment in 1965 in establishments not in the county in 1978.
[4] Establishments in the county in 1965 and 1978 that decreased employment between those dates.
[5] Refers to job gain and loss for all three counties.

SOURCE Storey (1985), Table 2.3, p. 16, and Table 2.6, p. 22.

Table 5-10

Components of Job Gain and Loss in Manufacturing Establishments, Scotland, 1968-77

	Job gain		Job loss			
	Opening	Expansion	Closure	Contraction	Gross job gain	Gross job loss
			(Percentage of 1968 employment)			
All establishments	10.0	10.1	17.4	17.7	20.1	35.1

SOURCE Cross (1981), Table 4.4, p. 49, and Table 4-8, p. 58.

rienced much less of a decline in manufacturing employment. The components of establishment job change for the period 1968-75 are presented in Table 5-11. Based originally on the Factory Inspectorate records, it was extensively augmented from other sources.

As with the other studies, the extent of gross job gain and loss is large relative to the amount of net change. New establishments – "openings" – accounted for some 40 per cent of the gross job gain during the seven-year period. The comparable percentage for Canada from 1971 to 1976 was 36 per cent; from 1976 to 1981, some 41 per cent. Closures in the Midlands accounted for 46 per cent of the gross job decline. The percentages for Canada were 51 per cent for the period 1971-76 and 47 per cent for 1976-81.

Employment decline from establishment exit in the Midlands for the seven-year period was approximately 12 per cent, for an implicit annual rate of 1.8 per cent. This compares to the Canadian implicit annual rate of 2.2 per cent for 1971-76 and 2.1 per cent for 1976-81. Fothergill and Gudgin note that the closure rate differed little across geographic regions and that the difference in net change in employment was the result of higher entry and expansion rates in growing regions rather than lower disappearance or contraction rates. Once more, the evidence suggests that expanding regions differ from contracting ones not in terms of the death rates but rather in terms of expansion and entry.

Attention now turns from job-change studies based on establishments to those based on firms. These studies have generally found that the percentage of new jobs created by new firms in the United Kingdom is small. Storey's (1985, Table 2.6, p. 22) study of the north counties found new firms (independent single-establishment firms) contributed only some 11 per cent of jobs created between 1965 and 1978. Cross's (1981, Table 4.5, p. 50) study of Scotland found new firms contributed only 9.5 per cent of jobs created. Fothergill and Gudgin's (1982) study of the job-creation process in

Table 5-11

Components of Job Gain and Loss in Manufacturing Firms, East Midlands and Leicestershire, 1968-75

	Opening			Survivor[1]			
	New firms	Local branches plus moves in[2]	Total	Expansion	Contraction	Closure[3]	Net change
				(Percentage of 1968 employment)			
East Midlands	4.1	5.7	9.8	14.9	14.3	12.0	–1.5
Cities	3.6	4.4	8.0	11.9	15.6	12.4	–8.1
Larger towns	2.9	8.2	11.1	11.5	13.7	10.3	–1.5
Smaller towns	4.8	7.4	12.2	18.5	12.4	13.3	5.0
Rural areas	6.2	8.2	14.4	24.9	12.7	9.8	16.8
Leicestershire	5.7	5.2	10.9	17.0	15.2	15.3	–2.6

[1] Includes transfers (geographic moves) internal to each type of area.

[2] Local branches are defined as branches and subsidiaries opened by firms operating in the region in 1968; moves in are defined as transfers in, plus new branches and subsidiaries of firms not operating in the region in 1968.

[3] Includes transfers out to another area.

SOURCE Fothergill and Gudgin (1982), Table 5-4, p. 78, and Table 8-4, p. 165.

the East Midlands found new firms created only 17 per cent of new jobs (see Table 5-11).

Other U.K. studies emphasize that firms new to manufacturing account for a very small proportion of total employment. Gould and Keeble (1984, Table 2, p. 192) found that new firms formed in East Anglia between 1971 and 1981 accounted for only 4.7 per cent of 1981 employment. They also summarized a number of other English studies, which cover periods ranging from seven to 10 years, and reported percentages of end-year employment accounted for by new enterprises that created establishments ranging from 2.2 to 5.2 per cent (ibid., Table 3, p. 193). Comparisons of these results to American and Canadian data have led a number of writers to conclude that the United Kingdom is less dynamic than North America when it comes to new firm creation.[17]

Upon closer examination, this conclusion is not borne out by the evidence presented. Gould and Keeble (1984, p. 193) and O'Farrell and Crouchley (1984, pp. 227-8) resort to Churchill's (1959*a*) business-enterprise data for the United States and Collins' (1972) establishment data for the province of Ontario. These are not comparable to the studies for the United Kingdom, since neither use employment to measure the importance of entry. Johnson (1986, pp. 91-4) and Storey (1982, pp. 16-21) draw their conclusions based on the Birch study[18] which does use employment. But as discussed above, the Birch study, as useful as it is for many purposes, overstates the importance of establishment birth relative to continuing establishment growth, thereby overestimating the contribution made by firms that are created by the opening of new establishments. Storey's (1985) data for Northern England and the Cross's (1981) data for Scotland show new establishments are roughly as important as the expansion of continuing establishments – a similar result to that found by Jacobson (1986) and Dunne et al. (1989) who used U.S. data superior to that of Birch. At least in terms of establishment births, the U.K. economy is no less dynamic than the U.S. economy.

Most of the U.K. job-change studies were not based on annual short-run comparisons but rather on longer periods. It was demonstrated in Chapter 3 that the importance of establishment entry and exit relative to the continuing establishment segment increases when periods longer than one year are used. Using firm data, similar results are obtained. For example, firms new to Canadian manufacturing between 1971 and 1976 accounted for 7.6 per cent of 1976 employment; for 1976-81, 11.9 per cent of 1981 employment; and for 1971-81, 20.6 per cent of 1981 employment. The latter period is the longest and therefore most comparable to several U.K. studies. On this basis, the importance of firm entry in Canada appears somewhat greater than in the United Kingdom. But only a portion of firm entry is by establishment creation (the definition used in most of the U.K. studies). The rest is by merger or acquisition. Over the period 1971-81, some 43 per cent of annual firm entry to the Canadian manufacturing sector occur by establishment creation when employment is used to measure its importance. Using this proportion, the category of new firms that arose from establishment creation in Canada accounts for no more than 8.8 per cent of 1981 employment.[19] Over the same decade, this category contributes only about 18 per cent of total job growth. These percentages are still above the estimates of Storey and Cross (though not those of Fothergill and Gudgin) but not by so much that we can be sure they are higher in light of the differences in the databases used.[20]

Finally, a recent study by Gallagher and Stewart (1986) provides data that suggests differences between the United Kingdom and Canada are less than was previously claimed. The authors use the Dun and Bradstreet records for the United Kingdom to calculate the components of job change in firms by comparing employment levels in 1971 and 1981. While the D&B records are less than comprehensive, techniques have now been devised to correct for underreporting in some areas. Moreover, the disadvantage of relatively slow updating is less of a problem over the longer period used for the U.K. study. The advantage of this database is that it covers all sectors of the United Kingdom rather than just manufacturing. The sample covers sectors that account for about 75 per cent of private-sector employment.[21]

The implicit annual job-change rates for the United Kingdom are reported in Table 5-12. The most comparable Canadian estimate, taken from the LEAP file, is presented as well. The latter, derived from firm data, is based on the entire economy less public administration and covers the period 1978-86. Even though the U.K. economy had a lower rate of net job creation, the death and contraction rates are remarkably similar to the Canadian estimates. Once again, differences in net job creation come not so much from differences in job-loss rates as differences in job-gain rates. Finally, the percentage of total job gain accounted for by births is higher, not lower, than the Canadian estimate.[22]

Conclusion

Many of the studies done on the components of job change in other countries have had a different focus than

Table 5-12

Comparison of the Components of Job Gain and Loss at the Firm Level, United Kingdom (1971-81) and Canada (1978-86)

			Continuing segment			
	Birth	Death	Expansion	Contraction	Gross job gain	Gross job loss
			(Implicit annual percentage rate)			
United Kingdom[1]	1.9	3.3	1.3	2.0	3.0	6.2
Canada[2]	2.9	2.5	2.8	1.9	5.2	4.8

[1] The implicit decline rates were calculated correctly, and not as done by Gallagher and Stewart (1986, p. 895), by calculating the implicit decline rate in exactly the same way as the implicit growth rate. (See raw data, Table 4, p. 892.) The incorrect annual death and contraction rates reported are 2.5 and 1.7 per cent, respectively.

[2] For the period 1978-86 from the LEAP file, all sectors are covered except public administration.

SOURCE Gallagher and Stewart (1986); and special tabulations provided by Statistics Canada.

the questions and issues set out in Chapter 1 of this study. Many have tried to determine what distinguishes regions that have experienced positive employment growth from those that have suffered an employment decline. The issue that has garnered much attention is the extent to which it is job gain or job loss that basically explains the performance of a region. Here the answers have expanded on Birch's (1979) and Armington and Odle's (1982) findings that it is job gain rather than loss that distinguishes regions from one another. Macey (1982) confirmed this pattern for the United Kingdom, where regional variations in gross job loss were small compared to variations in gross job gains. Storey and Johnson (1987*c*, pp. 92-4) summarized the large number of industry studies done for the United Kingdom as showing that:

> . . . those areas which experienced the lowest net decline in employment were those which were most successful in terms of new job creation. It is less true that they were the areas which lost fewest jobs.

Other studies have focused not so much on regional differences as on the relative performance of large and small firms. Many of these studies do not have a well developed model of intraindustry change in mind. As Johnson (1986) has pointed out, small-firm gains may cause large-firm losses if one regards the overall process of change in a broader context. In this case, it is inappropriate to conclude that job gain in small firms involves a net addition to jobs and to argue for special policies for this sector on this basis. Storey and Johnson (1987*b*) make essentially the same point. Notwithstanding the shortcomings in these studies, many provide evidence on the type of change that is relevant to the issues being examined here.

The first and most important conclusion is that there is considerably more gross job increase and decline than data on net employment change would suggest. Western market economies are all in a state of continuous change not just because there are intersectoral shifts in resources, but also because there is considerable intraindustry movements in labour as some firms grow and others decline.

Second, many of these studies have found a pattern in birth and death rates that corroborates the conclusions drawn from the Canadian data. All studies report that the percentage of jobs lost is quite high. Much of this is insensitive to economic conditions. This job loss occurs even in periods of growth. The same observation has been made by studies that find death rates are similar either across regions or over time. This has led to the observation that the death of firms and establishments is inevitable, and that little can probably be done to influence them. There is also considerable evidence that adjustment occurs primarily by variation in entry rates and that the factor distinguishing growing from declining or stagnant regions is the birth, not the death, rate. This finding can be found for the United States as a whole (Birch, 1979; Armington and Odle, 1982), Wisconsin (Leonard, 1987), Pennsylvania (Jacobson, 1986), and Scotland (Beesley and Hamilton, 1984). This, in turn, has led to the suggestion that it is growth-encouraging, not job-retention, policies that should provide the focus for industrial policy (Storey, 1985).

Third, studies done for other countries have found that entry is large. The most comprehensive samples (the U.S. Department of Commerce business enterprise numbers and the U.K. VAT figures) produce entry rates, based on the number of firms, of between 8 and 12 per cent per year. These figures are comparable to the gross entry rates produced by the LEAP file for all Canadian industries. It has also been found that a large percentage of new firms fail (Churchill, 1955; and Storey and Johnson, 1987*b*, p. 19). It would be incorrect, however, to conclude that entry is unimportant because of the high failure rate. Over the longer period, new establishments account for a significant proportion of total employment, as many of the U.K. studies have found. Numerous studies (Birch, 1979; OECD, 1987; Storey and Johnson, 1987*b*) have found that the percentage of employment growth accounted for by new establishments can range up to 50 per cent. But the actual percentage varies quite widely in the various regional studies done for the United Kingdom (Storey and Johnson, 1987*c*, Table 3.5, p. 87). This is to be expected, given the variations in these ratios across Canadian industry sectors that were reported in Chapter 4 and the different industrial bases found in the different regions. There is less agreement on how important new establishments created by new firms are to the process.

Fourth, many of the studies done for other countries have also confirmed that job change involves both cyclical and structural components. Data from Germany confirm the Canadian result reported in Chapter 3 that, in the long run, annual job-change rates in the continuing sector are lower than when calculated on a year-to-year basis. A considerable proportion of short-run change, then, is transitory from the firm point of view. This transitory component is observed both by Birch (1981) for the United States as a whole and by Leonard (1987) for Wisconsin. Similar results were found for France. However, the German data confirm the Canadian finding that entry and exit rates calculated over about a decade are approximately equal to those rates calculated on a year-to-year basis. Entry and exit then does not affect just the tail of the size distribution occupied by small producers. In particular, entry does lead to new firms and establishments, some of which grow significantly over time and which eventually account for a significant proportion of total employment.

Finally, studies done for other countries have found that entry and exit are generally a small-firm or small-establishment phenomenon. Early work at the Department of Commerce found business entry rates to be higher for the smaller-sized classes of employment (Churchill, 1954*b*). Birch (1979) found that, for the United States, both birth and death rates were higher for small establishments. The OECD (1987) reported that the employment created and lost from establishment openings and closures in both France and Germany was concentrated predominantly in small establishments. Job change in continuing establishments was also weighted more heavily to the smaller classes; but the concentration there was less heavily skewed to the smaller classes than for entry and exit. Fothergill and Gudgin (1982, Table 5.5, p. 80) found that, on balance, small establishments grow and large ones decline. In their study of a number of West European economies, conducted for the European Commission, Storey and Johnson (1987*b*, p. 15) concluded that small and medium-sized firms were creating jobs while large firms were reducing employment levels. Moreover, it points out that the contribution of the small firm to job growth was greater in periods of overall decline in employment (ibid., p. 16). These issues are dealt with in the Canadian context in Chapter 8.

6 Worker Turnover from Separation Data

Labour markets adjust continuously for two separate but related reasons. Some of the adjustment is firm-initiated. Workers may be laid off and forced to move because of the changing fortunes of firms. Other separations will occur because workers withdraw from the labour force for reasons such as illness, to return to school, or family responsibilities. In addition, some workers will quit and move to new employers because their skills did not suit their former employer or because of better opportunities elsewhere.

This study commenced by focusing on the components of change that are directly associated with the growth and decline of firms. Earlier chapters concentrated on measuring the size of job loss and gain normally experienced by the Canadian economy. Measures of job loss and gain focus on the number of positions available. Other measures focus on a separate but related concept – the size of separations of workers from their employers. The latter is a different concept in that it measures change in employee status rather than change in producer employment levels. The difference between the two is discussed at length in Chapter 1. Studies that focus on separation data yield measures of worker turnover as opposed to job change.

Total worker separations can be divided into those that the firm may have initiated (displacements) and those for which the worker was responsible (attritions). Displacements are likely to be primarily related to fluctuations in demand and production. They may be either temporary (the worker is rehired) or permanent. Attritions are other separations that are due to quits, retirement, sickness, pregnancy, return to school, dishonesty, or incompetence. These too can be divided into those that are temporary and those that are permanent.

In this literature, displacements are sometimes referred to as involuntary; attritions as voluntary. Unfortunately, it is the general administrative practice to include firings in categories usually described as consisting of voluntary separations (see Appendix D). This makes the distinction between voluntary and involuntary separations imperfect, though not meaningless. Others suggest displacements involve unexpected costs whereas attritions are "anticipated" and borne "voluntarily" (Brechling, 1978, p. 67) and, therefore, it is displaced workers who should be compensated by a society that reaps the benefits of a dynamic economy. This distinction too may be somewhat imperfect to the extent that workers voluntarily leave an employer whose long-term decline becomes evident to the work force. Consequently, attritions will also be related, though perhaps less closely, to the same forces that cause permanent layoffs, and the causal distinction implicit in the above prescription vanishes.

In Chapter 3, establishment growth and decline were used to measure employment change. Job-change studies are best aimed at phenomena that they measure directly – the growth and decline of producers. These studies can also be used to make statements about reallocation. But without additional information concerning the pattern of worker turnover, they cannot be used to make statements about the amount of dislocation of the work force caused by "forced" reallocation.

Job-change studies quantify the amount of forced reallocation only imperfectly for the same reasons that measures of interindustry change provide imperfect measures of the phenomenon. On the one hand, job loss may overestimate forced displacements. Job loss at the firm level may be incurred without any forced labour movement – if voluntary attritions are large enough to absorb job losses. It is, therefore, important to know the relative size of the two components – displacements and attritions. On the other hand, job-change measures may underestimate forced worker relocation. Employment change, when measured on a year-to-year basis, will miss seasonal fluctuations in positions available. This will cause measures of year-to-year position change to underestimate the amount of turnover that is occurring. Separation rates that measure all separations that take place during a year will overcome this latter shortcoming.

Even if neither of these two problems exist, yearly job-change measures may still not reflect the amount of forced relocation for another reason. Year-to-year changes in employment may all be reflected in displacements, but these displacements may only be temporary. Much of the year-to-year employment decline in continuing establishments is reversed in the longer run. Workers that are laid off because of these cyclical swings may return to the same employer in the next upswing. In this case, the short-run job-change measures will overstate the actual reallocation that is taking place. Separation data that allow the temporary and permanent components of both displacements and attritions to be measured permit us to ask whether much of the year-to-year fluctuations in employment are reflected only in temporary or permanent displacements and thus in labour relocation.

Separation data, then, can be used to relate the measures of job change that have been developed to the concept of worker displacement. But they are useful for more than just the information that they yield about the permanent-relocation rate occasioned by firm growth and decline. Firm employment can remain constant between two periods, even though some workers may leave the firm and others may be hired to replace them. In this case, job-change studies will underestimate the amount of underlying turbulence that occurs as a result of attritions and new hires that are taking place.

Attritions contribute to the size of the adjustment process. The use of establishment-initiated employment change and permanent displacements alone will underestimate the amount of labour force reallocation that the economy traditionally manages to absorb each year if the size of the attrition component is ignored. Moreover, it has been argued that the larger the attritions are, the greater is the potential for employment reductions in any particular industry without recourse to layoffs. Therefore, knowledge of the magnitude and the time pattern of this component is important.

While the concepts of job or position change and worker turnover are related, they measure quite different phenomena. Neither by itself is adequate; but taken together, they complement one another and begin to show how the demand and supply side of labour markets interact with one another. This chapter focuses principally on the size of the various components of separations. It also examines the extent to which they are affected by economic conditions.

The Relationship between Labour and Job Turnover

It is important to understand the relationship between the producer-related job-turnover data presented in Chapter 3 and the separation data discussed in this chapter. Figure 1-2 outlines the components making up the change in employment for any firm between two years. Employment in year 1 (A) consists of those workers who continue with the firm without interruption to the second year (B), workers who are laid off (C), and those who quit or separate for other reasons (D). Employment in year 2 (J) is equal to the sum of those in the continuing segment (B), those who are laid off but recalled (F), those attritions who are rehired (H), and, finally, new hires (E).

$$A = B + C + D. \qquad (6.1)$$

$$J = B + F + H + \mathrm{E}. \qquad (6.2)$$

Finally, the two rehire components are related to the corresponding separation categories by the equations:

$$F = \alpha\, C, \qquad (6.3)$$

$$H = \beta\, D. \qquad (6.4)$$

where α and β are the rehire rates.

In Chapter 3, employment change was measured as $(J - A)/A$. From the previous equations, the relationship between employment change and separations can be written as:

$$\frac{J-A}{A} = \frac{E}{A} - \frac{(1-\alpha)\,C}{A} - \frac{(1-\beta)\,D}{A}. \qquad (6.5)$$

The percentage change in employment is equal to the new hiring rate (E/A) less the permanent-layoff rate (C/A, corrected for recalls) and less the permanent-attrition rate, that is, quits plus other separations (D/A, corrected for recalls).

The measure of forced employment change derived in Chapter 3 from yearly data (job loss) may not equal worker turnover as a result of forced displacement for several reasons. First, job loss, as measured in Chapter 3, is derived from employment decline in that segment of the establishment population whose average annual employment has declined, including those that decline to zero – exits. Total labour released consists of separations that are not recalled. From equation 6.5, it is apparent that job loss will equal nonrecalled layoffs for declining establishments only if there are no quits and no new hires in the declining and exiting establishment segment or if the two just offset one another. With no new hires and some quits, job loss will overstate forced displacements; but the reverse could also occur. In declining firms, new hires are not likely to offset quits and job loss should overstate displacement. All this is predicated on there being little marginal turnover. If a small number of jobs are, however, constantly turned over during the course of the year, both permanent displacements and attritions, on the one hand, and new hires, on the other hand, will increase while leaving the net job change unaffected in equation 6.5. In this case, job loss will underestimate the permanent displacement effect.

Second, the growing and new establishment segment does not make any contribution to the measure of labour release derived in Chapter 3. A growing (or new) establishment is one whose average annual employment has increased. Changes in annual averages can hide considerable seasonal or other cyclical fluctuations in employment. If these fluctuations in the employment of growing firms are of less than one year in duration, they may lead to layoffs with some of the workers moving to other firms. Thus the growing firm segment may also be releasing labour annually. In addition, there will be some layoffs and some new hires in both the growing and declining sectors that are unrelated to employment levels. For example, growing firms may find a mismatch between the skills required and those supplied by their present work force. Adjustment to the required levels may result in layoffs and new hires. These separations will not be counted in the establishment-based measure of job loss.

While job-loss data taken by themselves have shortcomings for some purposes, so do separation data; otherwise they could be relied on exclusively for the analysis. Separation data cannot tell us what is happening to firm fortunes per se. They are also not suitable for analysing the effects of structural change on the economy for two reasons. First, total separations do not distinguish between temporary and permanent separations. Because they show so much turnover, they are discounted as being very meaningful for the analysis of structural change. The resolution of this problem is straightforward. Separations need to be broken into their components and differentiated on the basis of being temporary as opposed to permanent. This is done in this chapter.

There is a second problem with separation data that is not as easily resolved and that is best handled by setting these data side by side with job-change data. Labour turnover may arise from either short- or long-term changes in firm fortunes. The first is related to seasonal or cyclical effects; the second to structural adjustment. It is difficult to distinguish between these two sources of change using separation data alone. Some layoffs that result from temporary reductions in firm demand for labour will not return to the same employer even if demand subsequently increases. New jobs will be sought, found, and kept by those on temporary layoff. These layoffs are classified as permanent in that they do not return to the same employer within a specified period of time. Thus, permanent layoffs will occur even in firms that do not experience structural change but do experience short-run fluctuations in output and employment. It is by relating the results of the long- and short-run analyses of job change to the separation data that the amount of labour adjustment associated with longer-run structural adjustment in firm fortunes can be determined.

In the previous discussion, a number of reasons were suggested to account for possible differentials between job loss and "forced" displacement rates (permanent layoffs). When the job-loss and the forced displacement rates that were reported previously are compared, it is useful to recall that each has been calculated on a different base. Job-loss rates were calculated relative to employment. Worker separation rates here are calculated relative to the number of people holding a job in an industry in a year. The two concepts are linked since the number of jobs can be written as the number of people employed at the beginning of the year (A) and the number of new hires (E). Thus, in a two-period world, jobs (P) can be written as:

$$P = A + E. \tag{6.6}$$

Then we can rewrite equation 6.5 *without* quits and new hires as:

$$\frac{J-A}{A} = \frac{(\alpha - 1) * C}{P} * \frac{P}{A}, \tag{6.7}$$

where P/A is the ratio of the number of people holding jobs over the course of a year to the employment in the industry at the beginning of the period. Therefore, even if there is no bias in the job-loss statistics as a measure of forced displacements, the job-loss rate and the displacement rate, as calculated herein, will not be the same. In order to compare the two rates, a correction factor – the ratio of P/A – is required. For the economy as a whole, this ratio is about 1.13; for manufacturing it is about 1.35.[1]

In the following two sections, the evidence on the size and source of separations is reviewed for the United

States and Canada. Comparisons are made with the job-turnover data presented in Chapters 3 and 4. Chapter 3 dealt primarily with the manufacturing sector and was based on establishment data; Chapter 4 referred to all sectors of the economy including manufacturing and the measures developed therein were based primarily on firm data.

U.S. Data on Separations in the Manufacturing Sector

Data are available for the United States that show the annual separation rate in manufacturing for the period 1960-81. Separations are divided into layoffs (both permanent and temporary), quits, and other.[2] The annual average monthly separation rate per 100 employees in each of these categories is reported in Table 6-1 for the years 1971-81, along with mean values for the whole period. Layoffs, the component most directly related to firm fortunes, averaged only 33 per cent of total separations during that period. The sum of the other two components – quits and other separations – was twice the size of layoffs.

The monthly U.S separation rates suggest there is substantial worker turnover. The monthly layoff rate was 1.4 per cent on average, for a yearly total of 16.8 per cent. If quits and other separations (columns 2 and 4) are all permanent, in that they do not return to the same employer, an additional 33.6 per cent of employees annually may have moved to new employers over the period 1971-81. Some of these will be multiple separations, a portion will return to the same employer, and some will leave the labour force. As a result, this is a generous estimate of labour reallocation arising from separations.

It is unreasonable to assume that all employees on layoff will leave their existing employers. Some layoffs will be related to seasonal or short-run fluctuations in demand and will return to the same firm. The Bureau of Labor Statistics also collected, on a monthly basis, hire rates and new hire rates – the difference being rehires. The latter will primarily come from temporary layoffs.

Table 6-1

Monthly Separation Rates[1] in the Manufacturing Sector, United States, 1971-81

	Separations					Separations less rehires
	Total (1)	Quits[2] (2)	Layoffs[3] (3)	Other[4] (4)	Rehires (5)	(1) – (5) (6)
			(Per cent)			
1971	4.2	1.8	1.6	0.8	1.3	2.9
1972	4.3	2.3	1.1	0.9	1.2	3.1
1973	4.7	2.8	0.9	1.0	0.9	3.8
1974	4.9	2.4	1.5	1.0	1.0	3.9
1975	4.2	1.4	2.1	0.7	1.7	2.5
1976	3.8	1.7	1.3	0.8	1.3	2.5
1977	3.8	1.8	1.1	0.9	1.2	2.6
1978	3.9	2.1	0.9	0.9	1.0	2.9
1979	4.0	2.0	1.1	0.9	1.1	2.9
1980	4.0	1.5	1.7	0.8	1.4	2.6
1981	3.6	1.3	1.6	0.7	1.2	2.4
Mean	4.2	1.9	1.4	0.9	1.2	3.0

1 Annual average monthly rates per 100 employees.
2 Terminations of employment initiated by the employee for reasons not included in column 3.
3 Defined as suspensions without pay lasting or expecting to last more than seven consecutive calendar days, initiated by the employer without prejudice to the worker.
4 Includes terminations of employment because of discharge, permanent disability, death, retirement, transfer to another establishment of the company, and entrance in the Armed Forces for more than 30 days.

SOURCE United States, Bureau of Labor Statistics (1983), Table 77, p. 180.

A downward biased estimate of layoffs in any year that were forced to seek employment elsewhere is the difference between the layoff rate and the rehire rate (Table 6-1, columns 3 and 5; see Feldstein, 1975). It is only an approximation for any period, since some of the rehires will have come from layoffs in previous periods.[3] Following Feldstein, this difference is added to the quit rate and other separation rate (columns 2 and 4) and the total is reported in column 6. On average, the monthly value of this aggregate separation rate was 3 per cent for the period 1971-81 or 36 per cent annually. This is considerably higher than the annual job-loss figure of 8 to 9 per cent that the data for Canadian manufacturing produced when establishment employment totals were compared for adjacent years (see Chapter 3). But the monthly U.S. separation data contain seasonal and other short-term fluctuations that the Canadian job-loss rate calculated in Chapter 3 was designed to exclude. Therefore, as an estimate of labour force adjustment occasioned by long-term trends, this 36-per-cent separation rate for the United States is biased upward.

The U.S. mean attrition rate (quits plus other separations) is some two-thirds of the total separation rate (column 1) for the period 1971-81. This has been interpreted to imply that reductions in employment can be accomplished mainly by unreplaced attritions rather than by forced displacements. Two problems arise with such an interpretation. First, the attritions are two-thirds of separations on average; in order to argue that attritions facilitate separations over the business cycle, marginal changes are required. Quits and layoffs are inversely related as Table 6-1 indicates. When a recession increases layoffs, workers are less likely to leave or to search for another job.

Several attempts have been made to overcome this deficiency. Hamermesh (1969) models the various components of separations, assuming quits are functions of national unemployment rates. His results suggest that unreplaced attritions accomplish most of the net reduction in employment (Brechling, 1978, p. 72). Brechling models quits as endogenous to industry activity and finds less than half the net reduction in employment at the industry level will be accommodated by attritions.

There is a second difficulty with the claim that changes in employment may be easily facilitated by unreplaced attritions if it is based on comparisons of employment change and attritions when measured at the industry level. Employment change is accompanied by growth in some firms and decline in others. Attritions are not likely to be located just in those firms where employment is declining, while permanent layoffs will be concentrated in declining firms. Therefore, it is inappropriate to compare industry-wide attrition rates to layoff rates to infer the extent to which attritions "cover" layoffs.

Separation Rates in Canada

Traditional Sources of Separation Data

In contrast to the United States, detailed Canadian data on separations based on employer records have been unavailable until recently.

An establishment-based survey on hirings and separations by the Dominion Bureau of Statistics provided limited information on separations.[4] It showed annual average monthly separation rates between 1961 and 1966 of around 5 per cent.[5] However, no breakdown was provided between layoffs, quits, or other categories and the survey was discontinued in the 1960s. Data on the reasons for separating have had to be inferred from the Monthly Revised Labour Force Survey by Statistics Canada. These data do not permit turnover flows per se to be measured; they partition the stock of unemployed workers and those not in the labour force on the basis of the reason for the loss of job.

Using Labour Force Survey data, Gunderson (1986) divides the unemployed into job losers (those who lost their jobs or were laid off), job leavers (those who left their jobs because of illness, personal responsibilities, school attendance, retirement, or for other reasons), new entrants (those who never worked before), and re-entrants (those who had not worked in the previous five years) from 1975 to 1983. In 1975, job losers made up 39.4 per cent of the unemployed, job leavers 27.8 per cent (ibid., Table 4-1, p. 113). Between 1975 and 1983, the job losers increased to 59.3 per cent; job leavers declined to 13.8 per cent. If the job-loser category is associated with involuntary unemployment, these data suggest that involuntary separations have increased dramatically over this period, the latter part of which included the deep recession of 1982-83.

The Record of Employment Data

A comprehensive database has been created recently that allows a more detailed examination of separations.[6] It is derived from the Record of Employment (ROE) form that employers are required to file for each employee who has an interruption of earnings.[7] Data for 1974 to the mid-1980s exist on the number of separations. They are discussed at length in Appendix D.

Separations are broken down into layoffs (shortage of work), quits, and other causes (see Appendix D for further details). The database permits separations to be divided into those that return to the same employer (a return or temporary separation) and those that do not (a nonreturn or permanent separation). The number of separations assigned to each category will depend upon the time period over which the subsequent employment record of a worker is examined. In the data source used, a temporary separation is defined as a worker who returns to the same employer within two years.[8]

The distribution of reasons for separating for all Canadian industries is presented in Table 6-2 for the period 1974-86. Those who were laid off for lack of work made up, on average, 44.2 per cent of all separations. About half as many quit – 23.7 per cent of the total, on average. There are other categories besides quits that might also be regarded as "voluntary" or that provide a cushion for the adjustment processes. If return to school (*C*), pregnancy (*F*), early retirement (*G*), and other reasons (*K*) are added to quits, the sum of these five averaged 50.8 per cent of all separations. About half of all separations fall in this "voluntary" attrition category.

Over the period for which the reasons for separating are available, the proportion of separations that were most obviously "forced" (layoffs) has gone up. Some of this increase is associated with the recession years of 1982-83. The mean proportion for layoffs in these two years is 52.2 per cent – significantly above the mean for the period. Subsequently, the layoff proportion has returned to its average value. During 1982-83, the proportion of total separations accounted for by quits is lower than average – 15.5 per cent against the average of 23.7 per cent. This accords with Brechling's (1978) observation that quits are inversely related to economic conditions. The proportion of separations accounted for by the other separation category (*K*) remains relatively constant throughout the period.

The change in the distribution of separations between layoffs and the voluntary attrition categories (codes $C + F + G + K + E$) is similar to the trend in the contribution job losers and job leavers made to the stock of unemployed workers that Gunderson (1986, p. 113) observed. However, the absolute value of the contribution made by each is very different. Using the Labour Force Survey, Gunderson indicates that job losers made up about one and one-half times as much of the stock of unemployed workers as job leavers in 1975; by 1983, they made up more than four times the proportion of the unemployed that job leavers did. Table 6-2 shows much less of an increase in the percentage of the flow of worker separations that were laid off.

Canadian economy-wide separation rates, as opposed to the proportions in different categories, are presented in Table 6-3 for the years 1974-84. Total separations averaged 46.3 per cent over the period; layoffs, 19.8 per cent; quits, 11.2 per cent; and attritions other than quits, 15.3 per cent. The total separation rate is considerably above the 8-to-12-per-cent job-loss rate due to declining firms and exits recorded for all sectors in Chapter 4 from the LEAP file (see Table 6-3, column 9); but it cannot all be said to result in employee reallocation.

If separation data are to be used to estimate the number of workers who are reallocated annually, either because they were forced to do so by a change in their firms' fortunes or because they moved voluntarily, those who return to the same employer after a temporary layoff must be estimated. Subtracting rehires from layoffs as was done for the United States is one, admittedly arbitrary, method of doing so. A different method is adopted here. From the ROE data for Canada, it is possible to ascertain directly whether the employee who separated returned to the same employer. A period of two calendar years was chosen for examination of the subsequent employment record of separated workers to differentiate between permanent and temporary separations.

The rehire rates for layoffs, quits, and two residual categories for the period 1974-84 are reported in Table 6-4. On average, 57 per cent of layoffs were temporary (column 1). The rate is also high – some 61 per cent on average – for maternity, sick leave, and early retirement (column 3). It is 38 per cent for the miscellaneous other category (column 4). The lowest recall rate is for quits – averaging only 19 per cent (column 2). The overall recall rate is relatively constant except for the early 1980s when the most severe recession in 30 years occurred. During these years, a greater percentage of separations fall in the temporary-layoff category.

Table 6-4 shows that a large percentage of total separations (at least half of layoffs) return to the same employer within a short period of time; nevertheless the permanent-separation rate is not insignificant. The

Table 6-2

Distribution of Reasons for Separating,[1] All Industries, Canada, 1974-86

	Total	Layoff[2] (A)	Labour dispute (B)	Return to school (C)	Illness/ injury (D)	Quit (E)	Pregnancy (F)	Retirement (G)	Work sharing (H)	Other (K)
					(Per cent)					
1974	100.0	38.9	0.7	4.3	5.0	29.7	2.0	0.9	...	18.4
1975	100.0	44.4	0.9	4.1	4.7	25.9	2.1	1.0	...	17.1
1976	100.0	43.2	1.1	4.2	4.2	26.5	1.9	1.0	...	17.9
1977	100.0	44.8	0.6	4.3	4.2	24.5	2.0	0.9	...	18.7
1978	100.0	43.2	1.0	4.5	4.0	24.7	2.2	0.9	...	19.5
1979	100.0	37.9	0.4	4.7	3.8	28.0	2.2	0.9	...	22.3
1980	100.0	39.0	0.3	4.1	3.6	26.5	2.1	0.9	...	23.2
1981	100.0	42.0	0.3	3.9	3.2	26.5	2.2	0.9	0.4	20.5
1982	100.0	52.3	0.5	3.1	2.9	15.0	2.2	1.0	2.7	20.1
1983	100.0	52.0	0.2	2.4	3.5	16.0	2.4	1.0	1.3	20.5
1984	100.0	47.9	0.2	3.5	3.3	18.8	2.4	0.9	0.9	20.6
1985	100.0	44.4	0.2	3.6	3.3	22.1	2.4	0.8	0.5	21.1
1986	100.0	44.2	0.3	3.7	3.2	23.5	2.4	0.7	0.6	21.3
Mean	...	44.2	0.5	3.9	3.8	23.7	2.2	0.9	1.1	20.1
Standard error of mean	...	1.25	0.09	0.17	0.17	1.3	0.05	0.02	0.35	0.48
Coefficient of variation	...	10.18	61.8	16.1	16.7	19.1	7.8	9.5	81.0	8.7

1 Letters in parentheses refer to the code on the Record of Employment. One small category, apprenticeship (code J), has been omitted. For details, see Appendix D.

2 Separated for lack of work.

Source Robertson (1987*a*), Table A-13, n.p.; and unpublished data used for revisions and extensions.

Table 6-3

Separation Rates in All Industries, Canada, 1974-84

	Separations		Displacements			Attritions			
						Quits[3]			
	Total (3) + (6) + (8) (1)	All permanent separations (2)	Total layoffs[1] (3)	Temporary layoffs[2] (4)	Permanent layoffs (5)	Total (6)	Permanent (7)	Other[4] (8)	Gross job loss[5] (9)
				(Per cent)					
1974	44.3	27.0	16.5	8.9	7.6	13.4	10.9	14.4	..
1975	48.7	27.8	20.8	11.6	9.2	12.9	10.2	15.0	..
1976	46.0	27.1	19.0	10.1	8.9	12.5	10.0	14.5	..
1977	45.0	26.1	19.3	10.4	8.9	11.4	9.2	14.4	..
1978	45.1	25.9	18.6	9.9	8.7	11.4	9.2	15.1	8.2
1979	46.0	26.7	17.4	9.7	7.7	13.1	10.7	15.5	8.7
1980	45.1	25.3	17.3	10.3	7.0	11.9	9.8	15.9	8.5
1981	48.5	27.6	19.3	11.7	7.6	13.2	10.8	16.0	12.0
1982	50.0	22.9	25.7	16.3	9.4	7.8	6.4	16.5	12.4
1983	42.5	21.1	21.2	12.8	8.4	7.1	5.8	14.2	8.3
1984	47.7	24.3	22.2	13.2	9.0	8.8	7.3	16.6	6.5
Mean	46.3	25.6	19.8	11.4	8.4	11.2	9.2	15.3	...
Standard error of mean	0.67	0.63	0.79	0.64	0.24	0.69	0.54	0.26	...
Coefficient of variation	4.8	8.2	13.3	18.6	9.5	20.3	19.8	5.7	...

[1] Separated for lack of work.

[2] Those in column 3 who returned to the same employer within two years.

[3] Code E on the Record of Employment.

[4] All other reasons for separations except quits and layoffs for lack of work.

[5] See Table 4-4. Gross job loss includes loss from both firm exit and contraction.

SOURCE Table 4-4 for column 9; Robertson (1987*a*), Tables A-24 to A-33, n.p., and additional data provided by the author for columns 1 to 8; and Business and Labour Market Analysis Group, Statistics Canada. See Appendix D.

Table 6-4

Proportion of Employees Who Returned to the Same Employer, by Reason for Separating, All Industries, Canada, 1974-84

	Separations[1]				
	Layoffs (1)	Quits (2)	Pregnancy, illness/injury, and retirement[2] (3)	Other[3] (4)	All separations[4] (5)
1974	0.54	0.19	0.56	0.29	0.39
1975	0.56	0.21	0.59	0.34	0.43
1976	0.53	0.20	0.58	0.35	0.41
1977	0.54	0.19	0.58	0.35	0.42
1978	0.54	0.19	0.60	0.39	0.43
1979	0.55	0.18	0.57	0.38	0.42
1980	0.59	0.18	0.61	0.39	0.44
1981	0.60	0.18	0.59	0.36	0.43
1982	0.63	0.19	0.71	0.45	0.54
1983	0.61	0.18	0.66	0.42	0.50
1984	0.60	0.17	0.64	0.44	0.49
Mean	0.57	0.19	0.61	0.38	0.45

1 The recall rate is calculated by examining whether a worker who separates returns in the same or following year.
2 Codes D, F, and G on the ROE.
3 Codes B, C, H, J, and K on the ROE.
4 Codes A to K on the ROE.
SOURCE Robertson (1987*a*), Table 7, p. 18; and modifications based on Business and Labour Market Analysis Group, Statistics Canada. See Appendix D.

return rate in Table 6-4 is used to divide the total layoff rate in Table 6-3 into the temporary- and permanent-layoff rates (columns 3 to 5). Permanent layoffs average 8.4 per cent of employed workers per year for the period 1974-84. If quits and other separations are summed (columns 6 and 8), they amount to some 26.5 per cent of employment on average for 1974-84. The amount of "voluntary" permanent attritions (quits plus other) average 17.2 per cent of employment – about twice the average permanent-layoff rate of 8.4 per cent. Together, permanent-layoffs plus "voluntary" permanent attritions average 25.6 per cent of employment annually – more than three times the firm-related annual job-loss rate calculated for all sectors in Chapter 4.

It is significant that the permanent-layoff rate is similar to the annual or short-run job-loss rate calculated from the employment of exiting and declining firms.[9] Thus it is the annual, rather than the longer-run structural, rates of decline that are most closely related to forced worker separations. While structural and cyclical components produce different long-run and short-run estimates of job change, the latter do not overestimate the impact of fluctuating firm fortunes upon workers. Year-to-year employment fluctuations at the firm level may consist mostly of transitory change that will be reversed as far as the firm is concerned, but they are associated with a permanent reallocation of the work force of about equal magnitude.

The average separation rates for 1978-81 are presented by industrial sector in Table 6-5. The permanent-layoff rate, which is most directly related to job loss at the firm level, varies across sectors. Permanent-layoff rates are much higher than the firm-related job-loss rates calculated in Chapter 4 in the two most volatile sectors – construction and primary industries. This implies that employment fluctuations of less than a year or mismatches between the demand and supply of skills lead to substantial labour reallocation in these industries. The permanent-layoff rate in finance is lower than the job-loss rate, which suggests that attritions are far more

Table 6-5

Comparison of Job-Loss and Permanent Separation Rates,[1] by Selected Major Sector, Canada, 1978-81

	Gross job loss[2]	Permanent separations[3]		
		Layoffs	Quits	Total
		(Per cent)		
Construction	18.1	40.4	13.4	62.9
Primary	16.6	30.3	13.9	53.1
Trade[4]	8.6	5.4	9.3	21.7
Manufacturing	7.5	6.9	11.0	26.6
Community, business, and personal services	7.3	6.3	10.8	26.6
Finance, insurance, and real estate	7.2	2.1	9.1	19.0
Mines, quarries, and oil wells	6.5	6.7	17.2	33.2
Transportation, communications, and other utilities	7.8	4.1	7.1	16.9

1 All rates are calculated as a percentage of employed labour force. See Appendixes C and D for definitions of employed labour force used for job-loss and separation rates.

2 Calculated as the average for the period 1978-81. The total excludes public administration. Gross job loss includes loss from both firm exit and contraction.

3 Calculated as the average for 1978-81. Public administration is excluded. See Table 6-3 for definitions.

4 Wholesale and retail trade are combined.

SOURCE Appendix C for gross job loss; and Business and Labour Market Analysis Group, Statistics Canada.

important here for handling adjustment. Elsewhere, the permanent-layoff rate is close to the job-loss rate.

The ratio of the permanent-quit rate to the permanent-layoff rate also varies considerably sector by sector. It is highest in finance and mining. But there is less variance in the permanent-quit rate than in the permanent-layoff rate by sector. These differences suggest layoff rates are more industry-specific than quit rates. Quits and other separations will be a function of the same factors that affect the fortune of firms in an industry, but they are less affected by these factors than are layoff rates.

The stability over time of the various components of total separations for 29 industries covering all of the economy, except public administration, was also investigated. Using the 29-industry sample, correlations of the permanent-layoff rate, the quit rate, and the other layoff rate were calculated on their respective counterparts across three representative years (1975, 1978, and 1981).[10] The mean of the three correlations between the permanent-layoff rates for these years was 0.97; between the quit rates, 0.71; and between the other separation rates, 0.77. All correlations were extremely significant. While the level of layoff rates can change over time, this shows the interindustry distribution is relatively stable. Quits and other separations have a greater variability over time, since the correlations are lower – perhaps because as measured here, they have a return or recall component that has not been removed, as it was from the layoff rate.

The correlation between the various subcomponents of total separation indicates whether the interindustry distributions of each are similar. Table 6-6 provides the correlation matrix between the three-year averages (taken over 1975, 1978, and 1981) for each of the following: permanent layoffs, quits, and other separations; for the sum of quits and other separations (TURN1); and for the sum of the three (TURN2). The cross-partials are always positive between the different separation components. Wherever permanent layoffs are high, so are quits and other separations; but only the correlation between permanent layoffs and quits is highly significant. Whatever the industry characteristics that influence the layoff rate (decline, seasonality, shifts between firms within an industry), they are likely to affect worker behaviour that leads to attritions. This relationship was confirmed by examining the percentage changes in each of the components for 1975-78 and 1978-81. These changes (the results are not reported in tabular form) in permanent layoffs, quits, and other separations were positively correlated with one another. However, the exception was that between permanent layoffs and quits which was positive for 1975-78, but negative for 1978-81.

In Chapters 3, 4, and 5, it was noted that the exit rate, while having a large normal (and structural) component, would nevertheless be influenced by economic conditions. Exit is greater for recent entrants. High rates of entry can lead to higher exit rates in the near term. Similarly, long-term decline in the industry will increase the failure rate. In order to examine the effect of economic conditions on separation rates, two strategies were employed. First, the correlation between industry separation rates, averaged over 1975, 1978, and 1981, and the industry employment growth rates between 1975 and 1981 was examined. The correlations of the levels of employment separations on the ratio of the change in industry employment between 1975 and 1981 to 1975 industry employment are presented in Table 6-6. They are positive but only significant for permanent layoffs and TURN2 (permanent layoffs, quits, and other). If there are explanations for industry differences in the levels of separation rates, they do not lie just in the industry rate of employment growth. Moreover, the fact that the correlation between permanent layoffs and employment growth is positive, not negative, emphasizes that it is not just employment conditions but rather industry-specific conditions, like the degree of competition and technological change, that affect cross-sectional variation in separation rates.

In addition, the relationship between changes in the levels of the separation rates and employment change was examined separately for 1975-78 and 1978-81 (but not reported here in tabular form). The first period was one of overall expansion in the economy. During this time period, the change in permanent layoffs, quits, and other separation rates is positively related to employment growth across the sample. None of these correlations are significant. From 1978 to 1981, employment growth was higher than for the earlier period. In the latter period, there was a negative relationship between

Table 6-6

Cross-Sectional Correlations among Layoffs, Quits, Other Separations and Employment Change, Using 29 Industries,[1] Canada, 1975-81[2]

	Separations[3]			
	Permanent layoffs	Quits	Other[4]	Employment change[5]
		(Per cent)		
Permanent layoffs	1.000	0.503	0.255	0.390
	(0.000)	(0.005)	(0.181)	(0.036)
Quits	0.503	1.000	0.335	0.289
	(0.005)	(0.000)	(0.075)	(0.128)
Other	0.255	0.335	1.000	0.103
	(0.181)	(0.075)	(0.000)	(0.596)
TURN1[6]	0.420	...	...	0.208
	(0.023)	...	...	(0.278)
TURN2[7]	...	...	...	0.378
	...	...	...	(0.043)

[1] The same as that used in Table 2-8 except that the following industries were combined: forestry and fishing; knitting mills and clothing; wholesale and retail trade; financial institutions and insurance and real estate; education and related services and accommodation and food services. Public administration is excluded.

[2] The figures in parentheses indicate the probability of $\rho > 0$ under the null hypothesis that $\rho = 0$.

[3] Calculated as the average for 1975, 1978, and 1981.

[4] Defined as all separations except layoffs and quits.

[5] Calculated for the period 1975-81. See Appendix D for the employment concept used.

[6] TURN1 = quits + other.

[7] TURN2 = permanent layoffs + quits + other.

Source Robertson (1987*a*), Tables A-24 to A-33, n.p., and additional information provided by the author.

the changes in separation rates and employment change, which was significant for permanent layoffs and other separations.

From all of this, it can be concluded that, while separations are affected by industry activity, there is a significant component that is relatively constant.

Separations in the Canadian Manufacturing Sector

Since it is the manufacturing sector that garners the most attention in the debate over the effects of trade liberalization, separations as a percentage of employment in that sector for 1974-83 are reported in Table 6-7. The total separation rate for manufacturing is somewhat higher than for the economy as a whole (see Table 6-3). The temporary-layoff rate is also higher in the manufacturing sector than for all sectors; but permanent layoffs and quits are closer to those reported for all sectors. Permanent-layoff and quit rates reflect underlying forces related to the changing fortunes of firms and workers search patterns, while temporary layoffs reflect seasonality patterns of demand. There are apparently fewer interindustry differences in the former than in the latter.

The mean annual separation rate for manufacturing is 63.5 per cent. If temporary layoffs are removed from the Canadian total, the mean separation rate falls to 40.6 per cent (Table 6-7, column 2) – compared to a mean annual separation minus rehire rate of 36 per cent in the U.S. manufacturing sector (Table 6-1, column 6).[11]

The mean permanent-layoff rate in the Canadian manufacturing sector for 1974-83 is equal to 7.8 per cent of total employment – those with a job (Table 6-7, column 5). Once again, quits at 12.5 per cent are just as important as permanent layoffs in reallocating labour, while quits and other separations at 32.9 per cent together are more than three times as important.

Permanent-separation rates for the manufacturing sector are presented in Table 6-8. They are broken down into layoffs, quits, and a total for the period 1978-84. For this period, the permanent-layoff rate averages 7.7 per cent of all those with a major job in manufac-

Table 6-7

Annual Separation Rates in the Manufacturing Sector, Canada, 1974-83[1]

	Separations		Displacements			Attritions	
	Total (3) + (6) + (7) (1)	Less temporary layoffs (1) – (4) (2)	Total layoffs (3)	Temporary layoffs (4)	Permanent layoffs (5)	Quits (6)	Other (7)
				(Per cent)			
1974	64.5	46.3	24.8	18.2	6.6	18.3	21.4
1975	66.3	43.9	31.5	22.4	9.1	14.4	20.4
1976	63.5	43.7	27.9	19.8	8.2	14.6	21.0
1977	61.4	40.5	28.7	20.9	7.8	12.3	20.4
1978	55.3	40.0	22.9	15.3	7.6	11.8	20.6
1979	58.4	40.8	24.4	17.6	6.8	14.9	19.1
1980	59.1	37.8	27.6	21.3	6.3	12.6	18.9
1981	64.1	38.8	33.0	25.3	7.7	13.0	18.1
1982	83.7	42.5	50.9	41.2	9.7	6.7	26.1
1983	58.5	32.1	34.4	26.4	8.1	6.6	17.5
Mean	63.5	40.6	30.6	22.8	7.8	12.5	20.4
Standard error of mean	2.49	1.25	2.55	2.30	0.33	1.14	0.76
Coefficient of variation	12.4	9.7	26.3	31.9	13.7	28.8	11.8

1 For column definitions, see Table 6-3.

SOURCE Robertson (1987*a*), Tables A-24 to A-33, n.p., and additional data provided by the author; and Business and Labour Market Analysis Group, Statistics Canada.

Table 6-8

Comparison of Job-Loss and Permanent Separation Rates in the Manufacturing Sector, Canada, 1978-84

	Permanent separations			Gross job loss (4)
	Layoffs (1)	Quits (2)	Total (3)	
	(Per cent)			
1978	7.6	9.7	26.3	7.4
1979	6.8	12.7	28.3	8.0
1980	6.3	10.8	25.3	7.3
1981	7.7	11.1	27.1	12.9
1982	9.7	5.7	22.2	12.8
1983	8.1	5.3	19.3	7.0
1984	8.0	7.2	22.8	7.3
Mean	7.7	8.9	24.5	9.0
Standard error of mean	0.41	1.09	1.12	1.01

SOURCE Business and Labour Market Analysis Group, Statistics Canada, for columns 1 to 3; and Appendix C for column 4.

turing or 10.4 per cent of average Census of Manufactures employment using the appropriate correction factor. This is close to the 9.0 per cent average annual job-loss rate for the same period derived from the Statistics Canada LEAP file (Table 6-8, column 4).

If temporary- and permanent-layoff rates in manufacturing are compared, the former are more volatile (the standard error of the mean is larger). The short-run volatility associated with seasonality and business cycles is greater than that associated with longer-term decline in firm fortunes. Quits and other separations are less volatile than temporary layoffs.

It is important to ask whether separations that reallocate labour are highly sensitive to economic conditions or whether there is a considerable portion that continually takes place irrespective of economic conditions. The variations in the permanent-separation rates in Table 6-8 show that there is relatively little response to cyclical conditions. In 1982, the worst year since the Second World War, the permanent-layoff rate is only 2 percentage points above the mean. Quit rates respond somewhat more to economic conditions of the period. The quit rate is 3.2 percentage points below its mean value in 1982. If we exclude 1982-83, the permanent-layoff rate varies between 6.3 and 8.0 per cent; the quit rate between 7.2 and 12.7 per cent; and the total permanent-separation rate between 22.8 and 28.3 per cent. A substantial proportion of workers then is reallocated on an annual basis, and the amount by which this varies is relatively small for all but 1982.

As with the 29-industry sample for the entire economy, correlations among the separate layoff rates for the 19-industry two-digit manufacturing industries – knitting mills and clothing were combined – were calculated, but not reported here in tabular form. Each of the separation rates in 1975, 1978, and 1981 correlated quite highly with its respective counterpart for other years. The average correlation was 0.90 for permanent layoffs, 0.67 for quits, and 0.78 for other separations. All were highly significant. In contrast, there were few significant correlations between these different components for each year. Once more this suggests relative stability in causal factors determining interindustry differences in these separation rates – with somewhat greater stability for permanent layoffs. That the three components of the total separation rate were not as significantly correlated across categories as for all industries also suggests the determinants of interindustry differences in each are less similar in manufacturing than for the entire 29-industry sample that covers all sectors of the economy.

The levels of the three separation rates were not correlated with industry growth. Percentage changes in these rates for manufacturing between 1975-78 and 1978-81 were usually negatively related to employment growth over both periods, although the correlations were never significant. Thus, as before, industry-specific factors other than employment growth are likely to be more important in determining the levels of separation rates.

Conclusion

The first part of this study examined the extent to which jobs are continuously lost and created as a result of establishment and firm exit, decline, growth, and entry. Over the period 1970-81, the average job-loss rate from establishment exits was about 1.9 per cent annually in manufacturing (Table 3-4). The year-to-year continuing establishment decline rate was about 6.5 per cent (Table 3-5). The job-loss rate due to the two factors was about 8 per cent. Most of this is accounted for by the year-to-year loss in jobs in the continuing establishment segment. When a longer five-year period is used, the decline rate for the continuing segment falls to around 2 per cent and the sum of the two components to between 4 and 5 per cent annually (Table 3-9).

Whether the higher short-term or lower long-term job-loss rate is more closely related to the rate at which labour is being reallocated depends in part on the extent to which layoffs in declining establishments, which are associated with short-term fluctuations in employment, lead to temporary or permanent separations. It will also depend on the extent to which some permanent separations, which are not caught by a measure of employment change that concentrates only on the declining establishment segment of the population, occur annually in the growing establishment segment.

The data that have been presented in this chapter on the separation rate due to permanent layoffs indicate that it is at least as large as the job-loss rate calculated in Chapter 3 for declining establishments. For the period 1974-81, the annual permanent-layoff rate averaged 7.5 per cent for those with a major job in manufacturing or about 10.1 per cent of census measures of employment (Table 6-7). For the same period, the employment exit rate plus the continuing establishment decline rate averaged 9.1 per cent per year (Tables 3-4 and 3-5). The permanent-layoff rate derived from separation data is only slightly greater than the job-loss rate in declining establishments when calculated from annual data.

The separation data also show that there is another component besides layoffs that is continually reallocating labour. Quits and other attritions are about twice the size of permanent layoffs in the manufacturing sector. The component of this attrition rate that leads to permanent reallocation to another employer is at least the same size as the permanent-layoff rate. For manufacturing, the permanent-layoff rate averaged 7.7 per cent from 1978-84 (Table 6-8); the permanent-attrition rate, made up of quits plus other attritions, averaged 16.8 per cent. Together the sum of permanent displacements and attritions is almost 30 per cent on an annual basis.

While permanent layoffs, quits, and other attritions do respond to economic activity, there is, nevertheless, a substantial component of each that does not. A measure of this can be derived by taking the sum of the minimum values of each of permanent layoffs, quits, and other attritions over the period. For the economy as a whole over the period 1974-84, this minimum value is 19.7 per cent of employment – as compared to the mean value of the three of 25.6 per cent (Table 6-3), which contains a component affected by macroeconomic conditions. For manufacturing, the minimum value is 17.5 per cent for the period 1978-84 relative to a mean total permanent-separation rate of 24.5 per cent during the same period.[12]

Each of the three components of separations that reallocate labour (permanent layoffs, quits, and other attritions) did vary substantially across industries. But the interindustry variability was relatively constant – as was indicated by the high correlations of each component to itself across industries over time. Moreover, while at least one of the attrition components – quits – is highly correlated with the permanent-layoff rate, this does not apply in all years or for changes in permanent layoffs and quits for all periods examined. This implies that any references to the relative ability of different industries to adjust, based just on job-loss rates or permanent-layoff rates, may be incorrect.

In the manufacturing sector, it was found that both the level and rate of change in permanent layoffs, quits, and other separations were not significantly related to individual industry rates of employment change. Thus, industry-specific factors other than employment change, such as the intensity of competition and technology, are likely to be more important in determining the levels of attritions and displacements.

It should be noted that the correlations referred to above were observed by comparing three years (1975, 1978, and 1981), none of which were characterized by a severe economic recession. But aggregate quits and other attritions fell dramatically in the recession year of 1982 (Tables 6-3 and 6-7). There is, therefore, an economy-wide effect as suggested by Hamermesh

(1969) that is quite different from the industry effect referred to above. The level of attritions will then be different in a situation where aggregate demand is generally deficient, as opposed to one where some industries are growing and others are contracting – but on average where there is expansion in the economy.

7 Aspects of Worker Mobility

The Canadian economy has undergone substantial change over the past 15 years because of both cyclical fluctuations in economic activity and structural change. The degree of that change is often not appreciated. Earlier chapters quantified that change, first by measuring the number of jobs gained and lost as the result of the changing fortunes of firms, and then by detailing the extent to which workers separate from industries both because of layoffs and for other reasons such as quits.

Data on labour force mobility serve to supplement the data on job and worker turnover. Large turnover by itself does not show how flexible the labour force is when it is forced to move. Workers upon separation may move only to another employer in the same industry or to another job in the same occupational category. On the other hand, they may change industries, occupations, and regions relatively frequently. High turnover, along with high mobility, serve to emphasize the pervasiveness of change in a market economy.

There is, of course, the difficult issue of what is meant by "high" and "low" mobility. This requires appropriate benchmarks. In some instances, high or low is defined relative to an all economy-wide level; in others, relative to the existing distribution of jobs by region, age, and/or industry. However, in some cases there is no easily designed benchmark, and the meaning of high and low becomes more judgmental.

This chapter examines the extent to which workers show considerable mobility when they separate from a job. The first section of the chapter examines the extent to which workers change employers, occupations, and industries; the second investigates the pattern of interindustry movements; the third looks at geographic mobility; and the fourth examines how mobility varies by age class. More details of the underlying databases used in this chapter can be found in Appendix E.

The studies of worker mobility are detailed at some length in this chapter. The inclusion of worker-mobility research in this study not only fills an important part of the picture of labour mobility in the Canadian economy but also makes available more information on a small number of industries where particular concern about adjustment exists.[1]

Employer, Occupation, and Industry Mobility

In any given year, the number of worker separations is substantial. About one-half of these workers maintain a record of continuous employment but change employers; they do not draw unemployment insurance (UI) benefits. The other half draws UI benefits.[2] The extent to which workers change employers and occupations has been calculated for the latter group.

Grey (1985) used the longitudinal labour force file of the Canada Employment and Immigration Commission (CEIC) to track a sample of 17,216 individuals who received UI benefits twice during the period 1978-82.[3] Employers were compared in 1978 and 1982 for employees who had an employment separation at some time during that period.[4] The extent to which individuals from this sample changed employers is presented in Table 7-1 for different industries. Some 70 per cent of those who had at least two UI claims changed employers. At the sectoral level, those who become unemployed are most likely to change employers in trade, finance, and services. They are least likely to change employers in mines, construction, and manufacturing. However, the percentage of workers who shift to new employers, even here, is still high at around 52 per cent.

Individuals also tend to move to new industries after an employment separation. The same database on individuals who had at least two unemployment spells was used to compare the industry of the employer in 1978 and 1982 and to calculate the percentage of workers who separated and changed industries (defined as a new three-digit industry). The results by sectoral categories are reported in Table 7-2. Once again, workers in trade, finance, and services are the most mobile; those in manufacturing are among the least mobile. Even so, some 50 per cent of the latter change industries. Generally, workers who are laid off have less interindustry mobility, because a large percentage of layoffs will be temporary and these workers will return to the same employer. But the difference between the interindustry mobility of all workers who separate and those who are laid off is less than might be expected.

The capacity of the economy to adapt to change depends not just on the degree to which the work force can change employers or industries but also on its ability to change occupations. If skills are not easily transferred from one occupation to another, occupational mobility may be relatively low. If growing industries have different occupational requirements than those industries in decline, a mismatch between the demand and supply of skills will create problems. On the other hand, if skills are not unique to one occupation, worker mobility may bridge the gap.

Low levels of occupation mobility suggest rigidity. High levels are evidence of the reverse. However, the meaning of a high level of mobility is not unambiguous. It may be indicative of low-cost or high-cost adaptation.

Table 7-1

Distribution of Workers Who Remained with the Same Employer or Changed Employers, by Industry, Canada, 1978 and 1982[1]

	Workers who:	
	Remained with the same employer	Changed employers
	(Per cent)	
Agriculture	26.2	73.8
Forestry	27.8	72.2
Fishing and trapping	33.9	66.1
Mines, quarries, and oil wells	47.6	52.4
Manufacturing	48.0	52.0
Food and beverages	32.3	67.7
Tobacco products	40.0	60.0
Rubber and plastic products	22.9	77.1
Leather	28.9	71.1
Textiles	34.5	65.5
Knitting mills	25.7	74.3
Clothing	32.9	67.1
Wood products	28.0	72.0
Furniture and fixtures	27.6	72.4
Paper and allied products	49.9	50.1
Printing and publishing	28.5	71.5
Primary metals	55.0	45.0
Metallic mineral products	28.1	71.9
Machinery	41.9	58.1
Transportation equipment	64.2	35.8
Electrical products	36.2	63.8
Nonmetallic mineral products	32.2	67.8
Petroleum and coal products	36.0	64.0
Chemicals and chemical products	31.6	68.4
Miscellaneous manufacturing	28.0	72.0
Construction	48.1	51.9
Transportation, communications, and other utilities	35.0	65.0
Trade	17.7	82.3
Finance, insurance, and real estate	20.2	79.8
Community, business, and personal services	23.1	76.9
Public administration	27.0	73.0
Mean	30.7	69.3

[1] This table compares the status in 1978 and 1982 of workers who claimed unemployment insurance benefits at least twice during the intervening period. The data are drawn from Canada Employment and Immigration Commission's operational (longitudinal) data, based on a sample of 17,216 individuals.

SOURCE Grey (1985), Table 4, p. 11, and corrections supplied by the author.

Table 7-2

Proportion of Workers Who Changed Industry after an Employment Separation, by Industry, Canada, 1978 and 1982[1]

	Workers who changed industry[2]	
	All separations	Layoffs
	(Per cent)	
Agriculture	58.3	51.6
Forestry	48.3	45.6
Mines, quarries, and oil wells	59.8	58.8
Manufacturing	50.3	45.9
Construction	58.6	51.9
Transportation, communications, and other utilities	50.1	49.1
Trade	70.0	62.0
Finance, insurance, and real estate	64.8	65.5
Community, business, and personal services	62.0	56.6
Public administration	53.8	54.5

[1] This table compares the status in 1978 and 1982 of workers who claimed unemployment insurance benefits at least twice during the intervening period. The data are drawn from Canada Employment and Immigration Commission's operational (longitudinal) data, based on a sample of 17,216 individuals.

[2] A change in industry is defined at the three-digit level.

SOURCE Employment and Immigration Canada (1985), Table 11, p. 30.

Workers may have to accept lower wages in very different occupations in order to make the transition; or the changes in job structure may be the result of a search process associated with career advancement.

While there is some work on the changing structure of occupations for Canada (e.g., Picot and Lavallée, 1986), most of it is unsuitable for our purposes. Studies that focus on net changes in occupational structure only give an indication of the extent to which job structure is changing. By themselves, they cannot tell whether workers shift occupations readily or whether adaptation to the new occupational structure comes from permanent exits and new entrants to the labour force. If expanding demand in growing occupations is being filled primarily by new entrants to the labour force, then it is the entry rate that governs the rapidity with which these new demands can be met.

In contrast to other work, Grey (1985) provides information that links the degree to which workers change industries and occupations. He uses the CEIC file on individuals who, between 1978 and 1984, had at least two spells of unemployment during which they claimed UI benefits. It, therefore, does not include the large percentage of separations who move to another job without claiming UI benefits. A relatively short period of four years (1978-82) was chosen for comparison of the status of occupation and industry. Each worker was classified on the basis of the four-digit occupational code.[5]

A summary of mobility across occupations is presented in Table 7-3. Almost one-half of workers in the sample (46.5 per cent) changed occupations over the four-year period. As a standard of comparison, 29.5 per cent of those workers who remained with the same employer changed occupations. In contrast, 54 per cent of those who changed employers changed occupations (see Table 7-4). Workers who suffer an unemployment spell are, therefore, about twice as likely to change occupations if they change employers.

Table 7-3 can be used to divide occupations that are important to the manufacturing sector into two groups with respect to their pattern of mobility. For processing, machinery handling, and product handling, occupation shifting is higher than average – both for those who remain with the same employer (column 4) and for all individuals in the occupational category (column 2). But the ratio of the latter to the former is somewhat lower than for all occupations (column 5). Therefore, even though there is more intrafirm occupation mobility on average in this group, there is no greater overall tendency for these workers to shift occupations upon changing employer.

The reverse is the case for the second group of occupations, the clerical and sales force, that also make up a substantial portion of the labour force assigned to manufacturing. They have lower intrafirm occupation mobility than the average – but their overall occupation mobility is somewhat above the average for all occupations. This group exhibits relatively high occupation mobility upon employer transfer as indicated in column 5 of Table 7-3.

The rates of occupation change are summarized by industry in Table 7-4. The percentage of workers who change occupations is broken down into those who change employers and those who remain with the same employer. The former includes both intraindustry and interindustry shifts in employers. The ratio of the occupation change rate for those who change employers to those who stay with the same employer is presented in column 3. It measures the additional adaptability exhibited by, or forced upon, individuals when they change employers (and, as such, it is similar to column 5 of Table 7-3).

At the sectoral level of aggregation, the additional occupation mobility of workers who changed employers is highest in construction and lowest in agriculture and forestry – primarily because of low intrafirm occupation change in construction and the reverse in the two resource industries. Some of this difference may be the result of the breadth of the occupation code classes used in each of these industries. For the manufacturing sector, 43.7 per cent of those individuals who stayed with the same employer changed occupations. Intrafirm mobility is, therefore, high for manufacturing relative to other sectors. On the other hand, 67.2 per cent of those who changed employers in manufacturing also changed occupations. The ratio of occupation mobility associated with employer movement relative to no employer change is 1.5 for manufacturing as a whole. A worker who changes employers is about 50 per cent more likely to change occupations.

The different aspects of mobility dealt with here are summarized by broad industrial sector in Table 7-5. Unemployed workers may change employers, industries, and/or occupations. No matter which aspect is examined, it is clear that mobility is high.[6] Some 69.3 per cent of all workers who become unemployed change employers; 37 per cent change employers and occupations. Manufacturing, mines, and construction have the lowest percentage of individuals who change employers

Table 7-3

Employer and Occupation Mobility of Workers, by Occupation, Canada, 1978 and 1982[1]

	All workers who:		Workers who remained with the same employer and:		Additional occupation mobility of workers who changed employers[2] (2)/(4)	Distribution of manufacturing labour force, 1971 census
	Remained in the same occupation (1)	Changed occupations (2)	Remained in the same occupation (3)	Changed occupations (4)	(5)	(6)
	(Per cent)				(Ratio)	(Per cent)
Managerial and administrative	64.0	36.0	86.6	13.4	2.7	4.0
Natural sciences, engineering, and mathematics	64.3	35.7	85.6	14.4	2.5	3.8
Social sciences and related occupations	43.9	56.1	74.3	25.7	2.2	0.1
Religion	..	..	..	..	..	---
Teaching and related occupations	53.5	46.5	66.9	33.1	1.4	--
Medicine and health	60.0	40.0	79.2	20.8	1.9	0.3
Artistic, literary, and related occupations	43.5	56.5	66.7	33.3	1.7	{ 1.0
Recreation	41.7	58.3	44.4	55.6	1.0	
Clerical and related occupations	50.6	49.4	77.0	23.0	2.1	13.6
Sales	46.2	53.8	79.2	20.8	2.6	6.5
Community, business, and personal services	48.0	52.0	72.0	28.0	1.9	2.3
Farming, horticulture, and animal husbandry	39.6	60.4	58.7	41.3	1.5	0.2
Fishing, trapping, and related occupations	45.8	54.2	62.4	37.6	1.4	0.2
Forestry and logging	47.6	52.4	66.1	33.9	1.5	0.6
Mining, quarrying, and oil wells	45.1	54.9	58.9	41.2	1.3	0.2
Processing	46.0	54.0	60.9	39.1	1.4	16.4
Machining and related occupations	42.1	57.9	50.2	49.8	1.2	10.4
Product fabrication, assembly, and repair	45.2	54.8	60.5	39.5	1.4	20.8
Construction	53.6	46.4	68.4	31.6	1.5	3.3
Transportation equipment operating	40.0	60.0	61.5	38.5	1.6	2.2
Material handling and related occupations	56.5	43.5	82.6	17.4	2.5	5.4
Other crafts and equipment operating	43.5	56.5	60.5	39.5	1.4	3.5
All occupations	53.5	46.5	70.5	29.5	1.6	100.0

1 This table compares the status in 1978 and 1982 of workers who claimed unemployment insurance benefits at least twice during the intervening period. The data are drawn from Canada Employment and Immigration Commission's operational (longitudinal) data, based on a sample of 17,216 individuals.

2 That is, the ratio is total occupational mobility indexed by mobility within firms.

SOURCE Grey (1985), Table 7, p. 18; and *Census of Canada, 1971*.

(about 50 per cent). Nevertheless, this is still a high rate of change since the time period used is only five years. On the other hand, the manufacturing sector has a higher rate of occupation change overall. Over 55 per cent of workers change occupations in this sector compared to a sample average of 46.5 per cent.

The rate of interindustry movement is also presented in Table 7-5 (column 3), though it is for total separations and not just for those who have at least two spells of unemployment. Here, too, manufacturing exhibits somewhat lower mobility rates than other industries – though it is still high in an absolute sense (about 50 per cent).

The ratio of the percentage who change industries to the percentage who change employers is presented in column 5. Although the samples used to calculate each of these statistics are not identical, the ratio gives a rough idea of whether industries differ in the extent to which employer change is associated with industry change. Here manufacturing has a higher ratio than most of the service sectors. Thus mobility in manufacturing

Table 7-4

Employer and Occupation Mobility of Workers, by Industry, Canada, 1978 and 1982[1]

	Workers who changed occupations and:		Additional occupation mobility of workers who changed employers[2] (1)/(2) (3)
	Changed employers (1)	Remained with the same employer (2)	
	(Per cent)		(Ratio)
Agriculture	68.8	53.1	1.3
Forestry	63.2	50.0	1.3
Fishing and trapping	56.5	30.0	1.9
Mines, quarries, and oil wells	54.4	34.2	1.6
Manufacturing	67.2	43.7	1.5
Food and beverages	63.6	40.1	1.6
Tobacco products	. .	. .	. .
Rubber and plastic products	63.1	32.0	2.0
Leather	50.0	61.5	0.8
Textiles	64.9	61.5	1.1
Knitting mills	65.4	55.6	1.2
Clothing	62.8	43.0	1.5
Wood products	59.7	52.6	1.1
Furniture and fixtures	63.1	37.5	1.7
Paper and allied products	58.0	40.0	1.5
Printing and publishing	49.4	29.7	1.7
Primary metals	52.8	29.5	1.8
Metallic mineral products	57.6	32.6	1.8
Machinery	54.6	40.7	1.3
Transportation equipment	60.1	62.9	1.0
Electrical products	52.0	27.9	1.9
Nonmetallic mineral products	58.7	38.3	1.6
Petroleum and coal products	25.0	16.7	1.5
Chemicals and chemical products	50.8	12.9	3.9
Miscellaneous manufacturing	55.5	28.6	1.9
Construction	52.6	13.5	3.9
Transportation, communications, and other utilities	46.6	28.9	1.7
Trade	55.3	28.1	2.0
Finance, insurance, and real estate	51.3	28.7	1.8
Community, business, and personal services	52.9	31.7	1.7
Public administration	52.2	29.0	1.8
Mean	54.0	29.5	1.8

[1] This table compares the status in 1978 and 1982 of workers who claimed unemployment insurance benefits at least twice during the intervening period. The data are drawn from Canada Employment and Immigration Commission's operational (longitudinal) data, based on a sample of 17,216 individuals.

[2] The ratio is total occupational mobility indexed by mobility within firms.

SOURCE Grey (1985), Tables 4 and 8, pp. 11 and 20, and corrections supplied by the author.

Table 7-5

Summary of Employer, Occupation, and Industry Mobility of Workers, by Industry, Canada, 1978 and 1982[1]

	Workers who:				
	Changed employers (1)	Changed employers and occupations (2)	Changed industries (3)	Changed occupations (4)	Industry/ employer (3)/(1) (5)
	(Per cent)				(Ratio)
Agriculture	73.8	50.8	58.3	64.7	0.79
Forestry	72.2	45.6	48.3	59.5	0.67
Mines, quarries, and oil wells	52.4	28.6	59.8	44.8	1.14
Manufacturing	52.0	34.9	50.3	55.9	0.97
Construction	51.9	27.3	58.6	33.8	1.13
Transportation, communications, and other utilities	65.0	31.6	50.1	41.7	0.77
Trade	82.3	45.5	70.0	50.5	0.85
Finance, insurance, and real estate	79.8	40.9	64.8	46.7	0.81
Community, business, and personal services	76.9	47.7	62.0	48.0	0.81
Public administration	73.0	38.1	53.8	45.9	0.74
Mean	69.3	37.4	...	46.5	...

1 The occupational classification uses the four-digit occupational code with nearly 500 categories. The industry grouping uses the three-digit SIC classification. This table compares the status in 1978 and 1982 of workers who claimed unemployment insurance benefits at least twice during the intervening period. The data are drawn from Canada Employment and Immigration Commission's operational (longitudinal) data, based on a sample of 17,216 individuals.

SOURCE Grey (1985), Tables 4 and 8, pp. 11 and 20; and Employment and Immigration Canada (1985), Table 14, p. 35.

that is associated with employer change is more likely to be associated with industry change.

Interindustry Movements of Workers

The evidence on the degree of movement between employers, occupations, and industries by itself does not adequately reveal the degree of mobility, since it does not show whether workers who change jobs move only a short distance to other employers in the same industry or to closely related industries.

The movement of workers between eight broadly defined sectors can be obtained from a special supplement to the Labour Force Survey done in January 1986. This survey covered workers who were laid off and not recalled by the same employer, but who subsequently found work between 1981 and 1985.[7] It omits quits and other attritions. Workers were grouped on the basis of three goods-producing sectors (primary, construction, and manufacturing sectors) and five service sectors (transportation, trade, consumer services, finance and services to business, and public-sector services) and their movement was tabulated. The distribution of the destination of these workers by sector of origin is presented in Table 7-6.

The data indicate that about 40 per cent of displaced workers stay in their own sector (column 1). Although over 70 per cent of all jobs were in services, the percentage of workers who were displaced from goods-producing industries that move to service industries is never more than 43 per cent – with the highest percentage occurring in the manufacturing sector (column 3). Workers who are displaced from the service sector do move to the goods-producing sector – and the percentage that does so in trade, consumer services, and transportation is about equal to the percentage of all jobs represented by the goods-producing sector. The other service sectors have a lower percentage of laid-off workers moving to the goods-producing sector.

Studies of specific industries provide more detail on the interindustry pattern of worker mobility within the manufacturing sector. While they show the percentage

Table 7-6

Sectoral Destination of Displaced Workers, Canada, 1981-85[1]

	Sector of destination		
	Same as origin (1)	Any goods-producing industry (2)	Any service industry (3)
		(Per cent)	
Sector of origin:[2]			
Goods-producing industries			
Primary	40.8	59.0	41.0
Construction	46.3	66.7	33.3
Manufacturing	43.7	57.0	43.0
Service industries			
Transportation, communications, and other utilities	39.7	24.9	75.1
Trade	43.1	23.2	76.8
Consumer services	39.8	22.8	77.2
Finance, insurance, and real estate and services to business management	38.3	14.4	85.6
Public-sector services	49.4	18.8	82.2

1 The data came from a supplement to the Labour Force Survey conducted by Statistics Canada in January 1986 and cover the experience of workers who lost a full-time job between 1981 and 1984 and had not been recalled by the same employer by the end of 1985. The data refer only to workers who subsequently found full-time employment with another employer; quits and other attritions are therefore omitted. The data in column 1 are for a slightly different sample than the other two columns.

2 See source for a definition of sectors.

SOURCE Picot and Wannell (1987), Table 13, p. 150, and data supplied by the authors.

of separations that stays in the manufacturing sector as a whole is greater than the percentage of total employment accounted for by the manufacturing sector, they demonstrate that workers come from, and go to, a wide array of industries within this sector.

In an early attempt to examine the impact of plant closures in three import-sensitive industries – clothing, textiles, and electrical products – surveys were conducted of workers laid off because of plant closures and cutbacks (Economic Council of Canada, 1983, Table 9-10, p. 121). The percentage of laid-off workers who subsequently found work in the same industry was only 10 per cent for textiles, 19 per cent for electrical products, and 37 per cent for clothing. The percentage who found work in other manufacturing industries was 39, 47 and 24 per cent, respectively. The remainder (51, 34, and 39 per cent, respectively) went to services and other industries.

More recently, studies of interindustry mobility using administrative records allow interindustry mobility to be tabulated in more detail.

The Steel Industry

Allen (1985) used the longitudinal database developed by the CEIC to track the employment experience of steelworkers between 1978 and 1983. During that period, the labour force in the steel industry [Standard Industrial Classification (SIC) 291, 292, 305] fell from 97,270 to 86,114. This was the result of 33,292 workers exiting the industry and 22,136 entering it. Total permanent separations were some three times the net decline in industry employment.

The distribution of the industry of employment for those exits who were found to be employed in 1983 is presented in Table 7-7.[8] Most individuals who exited the industry left the manufacturing sector altogether and

Table 7-7

Distribution of Subsequent Employment of Workers Leaving the Steel Industry, by Industry, Canada, 1978 and 1983[1]

	Distribution
	(Per cent)
Service, finance, government sector	31.9
Primary industries, construction, utilities, and other	23.7
Trade	13.8
Other manufacturing	30.6
Metal fabricating and primary metals	6.6
Machinery and electrical products	5.2
Transportation equipment	4.4
Wood, furniture, paper, and printing	4.1
Food and beverages, tobacco, and other	3.9
Chemicals and petroleum products	3.4
Textiles, rubber, leather, and plastics	3.0

1 Exits were restricted to those workers who in 1978 had earnings in excess of $1,000 in SIC 291 (iron and steel mills), 292 (steel pipe and tube mills), and 305 (wire and wire products). The table refers to those exits who had employment in 1983.

SOURCE Allen (1985), p. E-12.

Table 7-8

Distribution of Footwear Workers, by Industry of Origin and Destination, Ontario and Quebec, 1974-83[1]

	Quebec		Ontario	
	Origin	Destination	Origin	Destination
	(Per cent)			
Agriculture	1.4	1.5	1.6	1.2
Forestry	0.3	0.5	0.4	0.3
Fishing and trapping	0.04	0.2	0.3	0.2
Mines, quarries, and oil wells	0.6	0.7	0.4	1.1
All manufacturing	45.6	44.5	49.7	43.7
Food and beverages	4.5	3.8	4.6	4.9
Tobacco products	0.1	...	...	...
Rubber and plastic products	2.0	2.8	4.8	3.6
Leather	2.1	1.5	1.1	0.6
Textiles	3.3	3.3	4.3	2.5
Knitting mills	2.4	1.1	2.0	0.7
Clothing	11.7	9.9	5.3	3.2
Wood products	2.6	1.8	1.6	2.2
Furniture and fixtures	2.7	1.9	2.4	2.2
Paper and allied products	1.9	1.7	1.8	0.8
Printing and publishing	0.7	0.9	1.0	1.1
Primary metals	0.8	0.8	1.2	1.3
Metal fabrication	2.1	3.2	4.5	4.6
Machinery	0.9	1.2	2.0	2.0
Transportation equipment	1.7	4.0	3.8	6.0
Electrical products	1.6	1.9	3.8	3.8
Nonmetallic mineral products	0.4	1.0	0.7	0.9
Petroleum and coal products	0.09	0.2	0.3	0.1
Chemicals and chemical products	0.5	1.1	0.8	0.8
Miscellaneous manufacturing	3.4	2.4	3.7	2.4
Construction	4.3	6.0	5.0	8.8
Transportation, communications, and other utilities	1.9	2.9	2.1	4.0
Trade	18.3	13.7	17.4	13.7
Finance, insurance, and real estate	6.1	8.5	5.1	6.9
Community, business, and personal services	17.6	17.3	15.6	16.9
Public administration	4.0	4.2	2.4	3.5
Total	100.0	100.0	100.0	100.0

[1] The footwear industry corresponds to SIC 174. The sample was taken from all workers with at least one week's employment in the footwear industry during the period 1974-83. The industry of destination refers to those entered by former footwear workers, after an indefinite layoff. It includes all subsequent jobs in the time period examined. The job of origin includes only the immediate job before entry.

SOURCE Alam (1985), Table 2-5, p. 23, Table 2-6, p. 24, Table 2-9, p. 28, and Table 2-10, p. 29.

went to the service sector. Only 30.6 per cent stayed in manufacturing and only 16.2 per cent remained in closely related industries – metal fabricating, machinery, and transportation equipment. Since only about 20 per cent of employment in all industries is in manufacturing, exits from the steel industry may be said to have been more heavily concentrated in manufacturing. Nevertheless, most exits spread themselves relatively widely across the economy.

The Footwear Industry

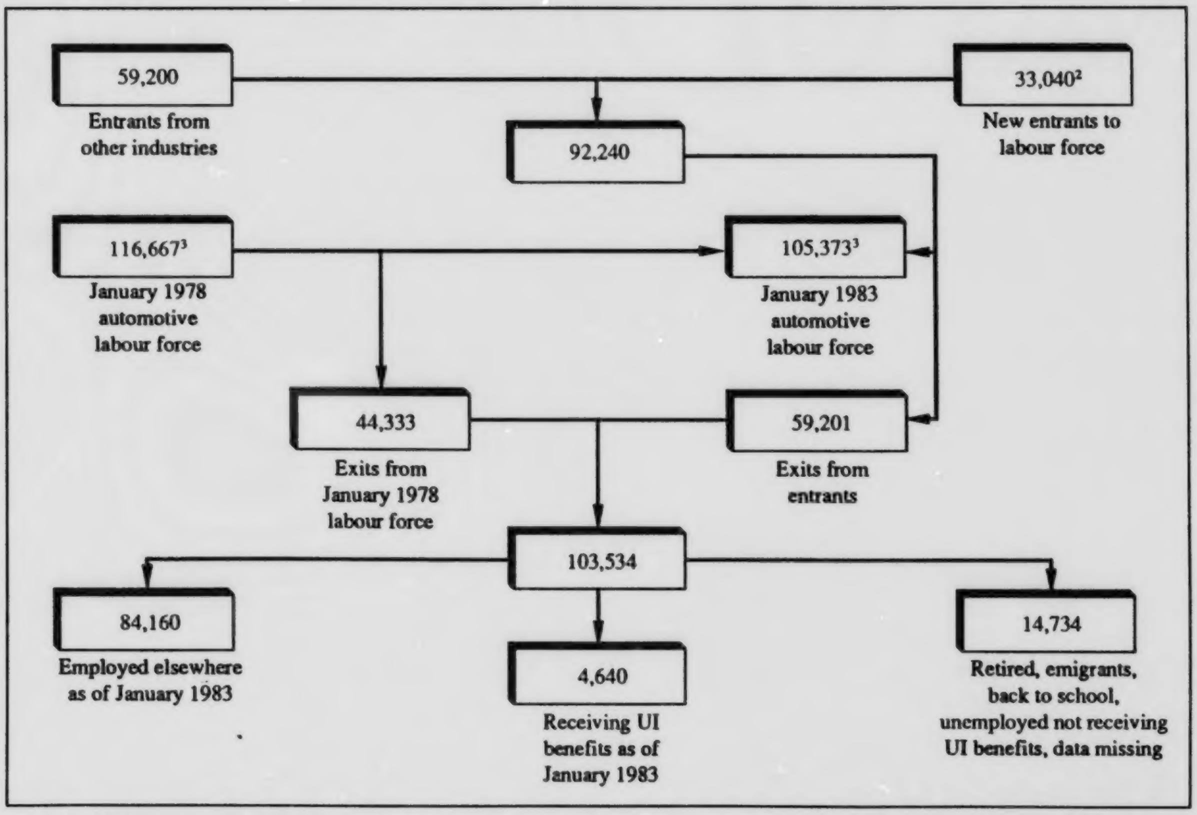
A study of interindustry mobility in the Canadian footwear industry (Alam, 1985) provides more detailed information than the steel industry study because it examines both the destination of workers who exit and the industry of origin of entrants. This study used two samples drawn from the longitudinal database developed by the CEIC – one each for Ontario and Quebec.[9] The industry of employment for workers prior to employment in footwear was tabulated, as was the ultimate employment location of those who left the industry after a permanent layoff for each of Ontario and Quebec (Table 7-8).[10]

The manufacturing sector provides the largest percentage of entrants – 45.6 per cent for Quebec; 49.7 per cent for Ontario. Within manufacturing, exits and entrants are spread widely, though not equally. The clothing industry provides about 25 per cent of the incoming workers from manufacturing in Quebec and 10 per cent in Ontario. Together the leading five of the 20 two-digit manufacturing industries account for about 23 and 25 per cent of all entrants in Quebec and Ontario, respectively, or about half of incoming workers from manufacturing.

A comparison of the distribution of workers by industry of origin and destination reveals a striking similarity between the two – though there are some specific differences. Among manufacturing industries, transportation equipment gains considerably more than it loses. Overall, fewer workers return to, than come from, manufacturing. In both provinces, the other leather goods industries (SIC 175, 179) neither contribute nor gain many workers from the footwear industries. Retail and wholesale trade contribute after manufacturing the next largest percentage of entrants (about 18 per cent), but fewer return to this sector (about 14 per cent). The per-

Figure 7-1

Labour Flows Into and Out of the Automotive Industry, Canada, January 1978 to January 1983[1]


59,200
Entrants from other industries
33,040[2]
New entrants to labour force
92,240
116,667[3]
January 1978 automotive labour force
105,373[3]
January 1983 automotive labour force
44,333
Exits from January 1978 labour force
59,201
Exits from entrants
103,534
84,160
Employed elsewhere as of January 1983
4,640
Receiving UI benefits as of January 1983
14,734
Retired, emigrants, back to school, unemployed not receiving UI benefits, data missing

1 Uses a 10-per-cent sample of individuals who worked at least one week in the automotive industry (SIC 323 – motor vehicle manufacturing, 325 – motor vehicle parts and accessories) between January 1972 and January 1983.

2 Includes all those who had never worked before and those who had worked only 20 weeks or less in a service-sector job before working in the automotive sector.

3 Employment levels based on CEIC administrative data.

SOURCE Automotive Industry Human Resources Task Force (1986), p. 165, and Figure 7-1, p. 167.

centage who move to services is about the same as for steelworkers who subsequently find work (Table 7-7). Finally, a large percentage come from, and return to, finance, services, and public administration. In Quebec, some 30 per cent return to these sectors; in Ontario, about 27 per cent – compared to 31.9 per cent in the steel industry.

As was the case with the steel industry, the manufacturing sector has a greater percentage of both entrants and exits than its share in total employment. Even though workers do move widely, the "closeness" of industries matters. Nevertheless, the similarity in the pattern of entrants and exits indicates there is a systematic pattern of search across sectors that leads to two-way rather than unidirectional flows in general.

The Automotive Industry

The automotive sector is characterized by both a high degree of worker turnover and considerable inter-industry worker mobility.[11] The components of the turnover are presented in Figure 7-1. Between 1978 and 1983, 92,240 workers entered the industry – about 80 per cent of employment in 1978. This means that about 16 per cent per year were new hires. Against that, 103,534 workers exited – about 89 per cent of employment in 1978. This yields a simple average separation rate of 18 per cent per year. Overall, employment fell only 9.7 per cent or about 2 per cent per year. Annual turnover rates (entry plus exit) of some 34 per cent were much higher than the 2 per cent annual net change in employment.

Of the workers entering the industry, 36 per cent obtained their first job. But a large percentage of all entrants to the industry (66 per cent) exited by 1983. In contrast, only 38 per cent of the employees at work in 1978 separated over the subsequent five years. Like new-firm entrants, recent-employee hires have the greatest probability of exiting. Therefore, a considerable percentage of adaptation comes from workers who have had little chance to build up firm-specific skills that usually make adaptation difficult.

The origin and destination, by industry, of separations is presented for the independent automotive parts industry and for the largest motor vehicle manufacturers in Table 7-9.[12] As was the case with both the steel and footwear industries, worker separations spread themselves widely across industries. For independent parts

Table 7-9

Distribution of Workers Entering or Exiting the Independent Parts and Motor Vehicle Industries, by Industry, Ontario, 1978-79 and 1981-82[1]

	Independent parts industry		Motor vehicle industry[2]	
	Entry	Exit	Entry	Exit
	(Per cent)			
Primary, mines, quarries, and oil wells	3.9	5.5	2.3	2.5
Manufacturing	35.7	35.5	24.7	19.1
Motor vehicles[2]	2.9	1.1	...	...
Independent parts	...	...	2.1	1.9
Metal fabrication	8.3	6.0	4.5	2.9
All others	24.5	28.4	18.1	14.3
Construction	5.3	5.6	9.0	12.4
Transportation, communications, and other utilities	2.9	2.5	4.5	3.9
Trade	16.7	19.5	19.9	12.8
Finance, insurance, and real estate	7.1	9.6	6.0	9.3
Community, business, and personal services	21.0	17.6	25.1	32.0
Public administration	7.3	4.2	8.6	8.1

1 Data for entries are drawn from 1978 and 1979. Data for exits are drawn from 1981 and 1982. Only those people entering the automotive industry from another industry or leaving the automotive sector for another industry are included. These percentages are based only on data from Ontario.

2 Data only for GM, Ford, Chrysler, and AMC/Renault.

SOURCE Automotive Industry Human Resources Task Force (1986), Table 7.1, p. 168.

Table 7-10

Distribution of Workers Entering or Exiting the Shipbuilding Industry, by Industry and by Region, Canada, 1972-84[1]

	Canada		Atlantic provinces		Quebec		Ontario		British Columbia	
	Entry	Exit	Entry	Exit	Entry	Exit	Entry	Exit	Entry	Exit
					(Per cent)					
Primary, mines, quarries, and oil wells	4.61	4.84	6.17	6.40	3.58	3.74	4.15	4.14	3.88	4.32
Manufacturing	32.11	29.32	32.74	28.94	30.92	28.39	37.08	36.22	29.77	24.87
Construction	19.25	19.81	14.14	17.19	17.69	18.26	17.54	14.91	26.12	27.21
Transportation, communications, and other utilities	6.16	7.46	4.95	6.55	6.49	7.59	8.77	11.60	5.48	5.41
Trade	12.46	9.00	15.15	10.42	13.21	8.03	10.65	9.70	10.28	7.92
Finance, insurance, and real estate	4.64	6.26	4.38	5.36	4.26	6.05	3.01	5.56	6.17	8.29
Community, business, and personal services	13.42	14.96	12.56	14.58	17.58	19.36	14.29	12.43	11.20	14.05
Public administration	7.35	8.35	9.91	10.57	6.27	8.58	4.51	5.44	7.08	7.93

[1] Entry is based on a sample of workers whose first and last job in the shipbuilding industry were recorded between 1972-84. Each sample selected only individuals who had at least one week of work in SIC 327 between 1972 and 1984 in the selected region. The sample size for each region is as follows: Canada, 6,724; Atlantic provinces, 2,056; Quebec, 1,666; Ontario, 1,247; and British Columbia, 1,817. There were five separate files created.

SOURCE Henderson (1987), pp. 11-15 and 17-21; and additional information provided by the author.

manufacturers, about 35 per cent go to other manufacturing industries, and about 31 per cent to finance, community services, and public administration. Separations from motor vehicle manufactures are less likely to continue in manufacturing (only 19 per cent) and more likely to go to the broadly defined service sector. Like the results for the footwear industry, the distribution of entrants and exits is broadly similar – though here a greater percentage of separations in the parts industry go to trade than come from it, and the reverse is true for motor vehicle manufactures.

The Shipbuilding Industry

A study of workers in the shipbuilding industry (SIC 327) between 1972 and 1984 also delineates the pattern of entrants and exits by industry.[13] In addition, it allows a comparison of the differences in these distributions across regions (Table 7-10).

As was the case with the footwear and automotive industries, the industry distribution of entrants and exits is similar. Workers come from, and return to, different industries in about the same proportions. Where these proportions differ, they generally do so in a similar fashion for different regions. In all regions, a greater proportion of workers come from manufacturing and trade than return to these sectors. Typically, fewer come from, than go to, transportation, communications, and other utilities and, except for Ontario, the same pattern holds for community, business, and personal services.

While there are similarities between the entering and exiting proportions within each region, the importance of each differs across the regions. Manufacturing is more important for Ontario with its industrial base. Construction is relatively more important for British Columbia. Quebec has a higher percentage of workers coming from, and going to, the community, business, and personal services sector than do the other regions.

Once again, there is considerable interindustry mobility. The importance of each sector varies across regions because of the differing industrial bases; but there is broad general movement of the labour force across sectors in all regions.

The Electrical/Electronics Industries

That the different regional employment bases have a considerable impact on the pattern of mobility is

Table 7-11

Industries in Which Workers Who Separated from the Electrical/Electronics Industry Found Their Next Job, by Region, Canada, January 1978 to January 1983[1]

	Western Canada	Ontario	Quebec	Atlantic provinces
	(Per cent)			
Primary, mines, quarries, and oil wells	5.5	2.0	3.3	1.6
Manufacturing	19.1	33.3	17.8	13.8
Construction	8.1	3.3	3.9	9.2
Trade	21.1	16.8	29.5	26.1
Transportation, communications, and other utilities	5.5	5.3	6.6	7.8
Finance, insurance, and real estate	8.1	13.3	5.6	7.8
Community, business, and personal services	25.8	20.7	25.0	29.1
Public administration	6.8	5.3	8.3	4.6

[1] The data cover a 10-per-cent sample of workers who between January 1977 and January 1983 had at least one spell of employment in the electrical and electronics products manufacturing industry and then left the industry. The table examines the next job of those who separated from the industry in 1977.

SOURCE Employment and Immigration Canada (1987), n.p.

confirmed in a study of the workers in the electrical/electronic sector.[14] Table 7-11 contains the industry distribution of the next job for workers who separated from this sector in 1977 for four different regions – Western Canada, Ontario, Quebec, and the Atlantic provinces. A much higher percentage of separations in Ontario than in other regions find employment in manufacturing. The other regions have a higher percentage than Ontario going to the trade and the community, business, and personal services sectors.

Regional Mobility

The previous sections have shown that there is considerable turnover of the labour force per year. A large number of workers separate from their jobs each year. Of these, some return to their previous employer but many change employers, industries, and/or occupations. By these criteria, mobility is high. However, the proportion of workers who migrate to other regions when making these employment changes is not as great.

This has two implications for adjustment policies. First, it means that workers in regions that have a diversified industrial base do not have to bear high moving costs. On the other hand, it means that workers elsewhere will have higher adjustment costs, either because they have to move further, or because they are more likely to be forced to accept less desirable alternatives.

Grey (1985) used the CEIC database on individuals who experienced two unemployment spells to examine the interregional mobility of workers. They are compared on the basis of their unemployment insurance economic region in 1978 versus 1982. On average, 11.6 per cent of the sample moved from one region to another during the five years studied. Table 7-12 presents a sample of the results by region. Low interregional rates are found both in those areas where there was weak employment growth (Avalon Peninsula, Gaspé, and Prince Edward Island) and in more rapidly growing urban areas like Montréal, Toronto, and Vancouver. Much higher rates exist for Halifax, Moncton, Fredericton, Québec, Belleville, and Windsor.

Regional mobility can also be studied by tracking all nonreturn or permanent layoffs using the CEIC Record of Employment data. All nonreturn layoffs (those who separated and found a job with another employer within two years) during the period 1974-81 were compared for job location before and after a layoff for different census metropolitan areas (Table 7-13). On average, 18.2 per cent moved to new regions – most to other census metropolitan areas. Once again geographic mobility varies considerably. Toronto and Montréal are below the mean. Rates much higher than the mean are exhibited by Calgary, Edmonton, and Winnipeg.[15]

Industry studies provide more detailed information on the degree of geographical mobility. One measure used for this purpose is the ratio of workers who made interprovincial moves into or out of a sector to the number of people who have been employed. The Automotive Industry Human Resources Task Force (1986, Table 7.2, p. 170) found that, for all those who worked in the automotive industry in Ontario and Quebec

Table 7-12

Regional Mobility of Workers, Canada, 1978 and 1982[1]

	Workers who:	
	Remained in the same region	Changed region
	(Per cent)	
Unemployment insurance region:		
Maritimes		
Avalon Peninsula	95.4	4.6
Fortune Bay/Gander	88.7	11.3
Corner Brook/Labrador	93.0	7.0
Prince Edward Island	91.3	8.7
Cape Breton	93.3	6.7
Cumberland/Gainsborough	91.9	8.1
Yarmouth and Kings	90.5	9.5
Halifax	88.5	11.5
Restigouche and Madawaska	92.1	7.9
Moncton	81.0	19.0
Saint John	96.6	3.4
Fredericton	78.1	21.9
Quebec		
Gaspé	92.7	7.3
Québec	74.7	25.3
Trois-Rivières	93.4	6.6
Eastern Townships	91.8	8.2
Montréal	96.9	3.1
Outaouais	93.3	6.7
Northern Quebec	93.0	7.0
Ontario		
Eastern Ontario	91.5	8.5
Belleville/Peterborough	84.0	16.0
Toronto	95.0	5.0
Niagara	93.4	6.6
London	95.9	4.1
Windsor/Sarnia	86.6	13.4
Kitchener	92.0	8.0
Georgian Bay	90.5	9.5
Sudbury/Sault Ste-Marie	95.4	4.6
Northwest Ontario	88.6	11.4
Manitoba		
Southern Manitoba	84.5	15.5
Parkland	88.9	11.1
Winnipeg	92.0	8.0
Saskatchewan		
Southern Saskatchewan	89.7	10.3
Saskatoon	90.3	9.7
Yorkton/Prince Albert	90.6	9.4
Prairies		
Southern/central Alberta	88.5	11.5
Calgary	90.7	9.3
Edmonton	92.5	7.5
Northern Prairie region	85.9	14.1
British Columbia		
The Kootenays	91.5	8.5
Kelowna	89.4	10.6
Kamloops	80.0	20.0
Vancouver	96.1	3.9
Victoria/Vancouver Island	90.5	9.5
Northern British Columbia	87.5	12.5
Northern Canada[2]	85.0	15.0
Mean	88.4	11.6
Standard error of mean	5.04	5.04

[1] This table compares the status in 1978 and 1982 of workers who claimed unemployment insurance benefits at least twice during the intervening period. The data are drawn from the Canada Employment and Immigration Commission's operational (longitudinal) data, based on a sample of 17,216 individuals.

[2] Based on a sample of less than 30. No reliable inference.

SOURCE Grey (1985), Table 2, pp. 7-8.

between January 1972 and December 1983, 16 per cent made at least one interprovincial move either to, or away from, a job in this sector. A large percentage of the moves were accounted for by a relatively small group; there were 2.4 moves per mover, on average, in Ontario during the period; 2.6 in Quebec. A similarly defined mobility rate for the manufacturing sector as a whole yielded 18.7 per cent for Ontario and 14.6 per cent for Quebec.

These rates can be compared to the separation rates in the automotive sector to give a rough idea of how important geographical mobility is relative to job mobility. The task force found that exits between 1978 and 1983 were 89 per cent of the labour force in 1978 or 17.7 per cent per year (Figure 7-1). If this rate is cumulated for 11 years – the period used in the task force report to measure interprovincial moves – interprovincial moves would amount to about 8 per cent of all separations.

As the geographic area is narrowed, the mobility rate increases for the automotive industry. The task force found that the previously defined mobility rate over the

Table 7-13

Average Annual Mobility Rates of Permanent Layoffs, by Census Metropolitan Area, Canada, 1974-81[1]

	Workers who:			
	Moved to a census metropolitan area	Moved to a noncensus metropolitan area	Total mobility rate	Stayers
		(Per cent)		
St. John's (Newfoundland)	9.1	6.1	15.2	84.8
Halifax	20.0	12.3	32.3	67.7
St. John (New Brunswick)	15.5	6.9	22.4	77.6
Québec	16.4	1.1	17.5	82.5
Trois-Rivières	10.4	1.3	11.7	88.3
Montréal	12.6	1.7	14.3	85.7
Ottawa-Hull	14.2	2.4	16.6	83.4
Chicoutimi-Jonquière	17.9	1.3	19.2	80.8
Toronto-Oshawa	12.4	3.7	16.1	83.9
Hamilton-St. Catherines	23.1	–	23.1	76.9
London	15.9	1.1	17.0	83.0
Windsor	20.9	2.7	23.6	76.4
Kitchener	17.1	1.7	18.8	81.2
Sudbury	29.6	3.7	33.3	66.7
Thunder Bay	24.3	–	24.3	75.7
Winnipeg	30.0	9.9	39.9	60.1
Regina	21.1	3.5	24.6	75.4
Saskatoon	22.2	14.8	37.0	63.0
Calgary	38.2	15.5	53.7	46.3
Edmonton	31.6	9.6	41.2	58.8
Vancouver	18.2	4.9	23.1	76.9
Victoria	24.5	3.2	27.7	72.3
Total	15.3	2.9	18.2	81.8

[1] Estimates refer to next job location within a two-year period. Based on data from the Canada Employment and Immigration Commission's Record of Employment and Revenue Canada's administrative data (T4s, PAYDAC).

SOURCE Data supplied by Labour Market Studies Division, Employment and Immigration Canada.

1972-83 period for Windsor was 22 per cent; for Kitchener, 39 per cent; and for Toronto, 24 per cent. The split between intraprovincial and interprovincial moves for each of these areas was 72 to 28, 66 to 34, and 74 to 26, respectively. Most moves then in this industry are intraprovincial rather than interprovincial.

The automotive industry task force also observed that the distribution of moves was relatively constant over the 11-year period. No close correlation was observed with the success or failure of the automotive industry. The task force report concluded that economic conditions elsewhere were as important a factor in determining moves as conditions in the automotive sector.

Finally, the age distribution of movers in the automotive industry illustrates that the search process for new jobs is most intense amongst younger workers. Table 7-14 gives the age distribution of the work force for movers (interprovincial) and stayers. A much higher percentage of the 20-29 age class are movers rather than stayers. The reverse is true for workers who are older than 30 years of age.

Alam (1985) tracked the location of footwear workers who entered and left the industry between 1974 and 1983. The geographical distribution of these two categories is presented in Table 7-15. Interprovincial mobility is higher for Ontario than Quebec. In Ontario, 14.3 per cent of entrants came from outside the province; in Quebec, only 6.6 per cent. The difference is greater for those permanently leaving the industry. For Ontario, 19.1 per cent leave the province; for Quebec, only 5.8 per cent do so.

Table 7-14

Distribution of Interprovincial Movers and Stayers in the Automotive Work Force, by Age Group, Quebec and Ontario, 1972-83[1]

	Quebec		Ontario	
	Movers	Stayers	Movers	Stayers
	(Per cent)			
Age group:				
Less than 20	17	2	17	1
20-29	45	34	60	35
30-39	22	34	17	29
40 and over	16	30	6	35
Total	100	100	100	100

1 Movers constitute those in the automotive work force who moved interprovincially immediately before or after their automotive jobs. Stayers constitute all other automotive workers.

SOURCE Automotive Industry Human Resources Task Force (1986), Table 7.3, p. 173.

The within-region geographic mobility of footwear workers can be gauged by comparing the percentage of workers who came from, and went to, the same broadly defined area – in Ontario, using Toronto, Hamilton, Kitchener-Guelph, and other areas; in Quebec, using Montréal, Sherbrooke, Québec, and other areas. Two percentages for each are given in Table 7-15. The first represents the percentage of all exits and entrants; the second, the percentage of entrants and exits just from Ontario or Quebec, respectively. In Ontario, there was a general movement out of Toronto, Hamilton, and Kitchener-Guelph into other areas. In Quebec, there was a movement out of Québec and Sherbrooke into Montréal and other regions.

Mobility across Age Classes

A discussion of the characteristics of turnover is not complete without an examination of the distribution of worker turnover by different age classes. Concern has often been expressed that older workers have greater difficulty in finding new jobs than younger workers or that they suffer greater costs in doing so. Knowledge of the relative costs of adjustment is a prerequisite for the development of a policy to aid the labour-adjustment process.

In Chapter 3, the nature of job loss associated with producer decline and exit was examined. Firm exits were shown to be closely related to entrants, since a large percentage of entrants fail in the first few years after birth. Exit is part of a self-selection process. While numerous exogenous changes in the environment, from technological progress to trade policy, have an impact on firms in a given industry, the aggregate failure rate is

Table 7-15

Distribution of Workers Entering or Exiting the Footwear Industry, by Region, Ontario and Quebec, 1974-83[1]

	Ontario	
	Entry	Exit
	(Per cent)	
Atlantic provinces	5.0	3.9
Ontario	85.5	80.9
Toronto	25.0 (29.0)	20.4 (25.2)
Hamilton	6.3 (7.3)	2.4 (3.0)
Kitchener-Guelph	23.6 (27.6)	21.0 (26.0)
Other	30.6 (35.7)	37.1 (45.8)
Quebec	7.7	8.1
Western Canada	1.6	7.1
Out of province	14.3	19.1

	Quebec	
	Entry	Exit
	(Per cent)	
Atlantic provinces	1.3	0.5
Quebec	93.2	94.2
Montréal	34.7 (37.2)	41.2 (43.7)
Sherbrooke	15.5 (16.6)	12.7 (13.4)
Québec	15.0 (16.1)	9.7 (10.2)
Other	27.9 (29.9)	30.7 (32.5)
Ontario	4.4	3.9
Western Canada	0.9	1.4
Out of province	6.6	5.8

1 The percentages in parentheses refer to within Ontario and Quebec mobility. See text for further discussion. Exits are all permanent layoffs that move to another industry. The interprovincial move may not have come after the first exit since all subsequent locations of the workers were examined. The sample refers to those who entered and exited the footwear industry between 1974 and 1983.

SOURCE Alam (1985), Tables 2-11 to 2-14, pp. 30-3.

relatively constant – suggesting that it is not so much the exogenous shock that matters but the ability of management to adapt, and that in any firm population, there will be a certain relatively constant percentage who cannot succeed and will subsequently fail.

Part of the labour force turnover results from this firm entry and exit process – the permanent-layoff component. Not surprisingly then, the firm- and worker-turnover processes resemble one another. Worker separations are a function of entry. Recent entrants are the most likely to separate from their jobs.

An examination of worker separations by age class shows that exits are concentrated in the youngest age groups. The distribution of total separations and several of its largest components by age class for 1984 is presented in Table 7-16, along with the distribution of employment. It is apparent that adjustment is accomplished at the margin primarily by the movement of younger workers. The two youngest age classes (17-24 and 25-34) account for a greater percentage of separations than of employment. Younger workers, then, bear a large share of the adjustment burden. The same conclusion also holds if the most important subcomponents – layoffs, quits, and other – are examined. Indeed, the burden of layoffs is even higher for the youngest classes if only permanent layoffs rather than total layoffs are considered. The percentage of total layoffs in 1982 that were permanent for the 17-24 age class was 58.8 per cent; for the 25-34 age class, 50.2 per cent; for the 35-44 age class, 46.6 per cent; for the 45-54 age class, 40.1 per cent; for the 55-59 age class, 38.5 per cent; and for the 60-65 age class, 32.2 per cent (Robertson, 1978*a*, Table 17, p. 20).

While young workers account for a greater proportion of separations than of employment, this does not indicate by itself that they are shouldering a disproportionate share of the adjustment burden. Young workers are more likely to be taking up their first jobs and, compared with older workers, less likely to have found a job that suits their skills and preferences. Hasan and de Broucker (1985, Table 6-9, p. 49) calculate that some 29.1 per cent of workers in the 20-24 age class in 1981 had started a new job.[16] For the 30-34 age class, only 14.0 per cent of workers had started a new job; for the 40-44 age class, 9.6 per cent; for the 50-54 age class, 7.2 per cent; and for the 60-64 age class, 5.2 per cent.

The Hasan and de Broucker data were used to calculate the percentage of all new jobs accounted for by a

Table 7-16

Distribution of Total Employment, New Entrants, and Separations, by Reason for Separating and by Age Group, Canada, Early 1980s

			Separations, 1984				
	Total employment, 1981 (1)	New job holders,[1] 1981 (2)	Total (3)	Layoffs (4)	Quits (5)	Quits plus permanent layoffs[2] (6)	Other (7)
				(Per cent)			
Age group:							
17-24	22.5	47.0	31.2	27.1	41.5	36.3	34.5
25-34	29.5	28.6	32.5	32.7	33.5	33.3	31.4
35-44	21.0	13.2	17.7	19.3	15.2	16.9	17.7
45-54	16.4	7.7	10.8	12.8	6.9	8.8	9.4
55-59	6.5	2.2	4.4	5.2	1.8	3.1	3.6
60-65[3]	4.1	1.3	3.4	2.9	1.1	1.6	3.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

1 Hasan and de Broucker estimated the proportions of new job holders in more detail than is available from published census employment data. Where necessary, the simple average of their proportions was used.

2 The permanent-layoff rate is from 1982 rather than 1984.

3 Age groups in columns 1 and 2 are for 60-64 rather than 60-65.

SOURCE Total-employment data from Statistics Canada, *Census of Canada, 1981*, No. 92-915, Table 1, and *The Labour Force*, No. 71-001, December 1981; data on new jobs derived from Hasan and de Broucker (1985), p. 49; data on separations from Robertson (1987*a*), pp. 15 and 34; and estimates by the Economic Council of Canada.

Table 7-17

Employer and Occupation Mobility, by Age Group, Canada, 1978-82[1]

			Occupation mobility[2]				
	Employer mobility		Workers who changed employers and:		Workers who remained with the same employer and:		Relative value of occupation mobility conditional on employer change (4)/(6) (7)
	Workers who remained with the same employer (1)	Workers who changed employers (2)	Remained in the same occupation (3)	Changed occupations (4)	Remained in the same occupation (5)	Changed occupations (6)	
			(Per cent)				(Ratio)
Age group:							
21-25	19.9	80.1	41.0	59.0	63.3	36.7	1.6
26-35	30.2	69.8	48.9	51.1	67.2	37.8	1.4
36-45	38.1	61.9	52.0	48.0	70.3	29.7	1.6
46-55	46.8	53.2	49.8	50.2	75.2	24.8	2.0
56-65	54.2	45.8	51.6	48.4	72.6	27.4	1.8
All groups[3]	30.7	69.3	46.0	54.0	70.5	29.5	1.8

[1] This table compares the status in 1978 and 1982 of workers who experienced at least two job separations during the intervening period. The data are drawn from Canada Employment and Immigration Commission's operational (longitudinal) data, based on a sample of 17,216 individuals.

[2] This uses the four-digit CCDO occupation classification.

[3] Includes workers less than 20 years old not reported in the previous rows.

SOURCE Employment and Immigration Canada (1985), Table 17, p. 37; and Grey (1983), Table 3, p. 10.

given age class. The results are tabulated in Table 7-16. The distribution of new jobs varies by age class much as does quits or quits plus permanent layoffs. Total separations do not decline quite as markedly across age classes as does the new-job category – probably because the "other" category, which includes pregnancy, illness, and strikes, is not spread across the various age groups in the same proportion as are new jobs. Nevertheless, young workers do not bear a disproportionate share of adjustment when the relevant criterion is the percentage of new jobs that they account for rather than their percentage of employment. The firm entry-exit analogy, then, is appropriate for the labour-turnover process. Like the firm entry and exit process, worker entry and exit is closely related. Exits are high in those age groups where entry is also high.

Young workers not only contribute the most to labour turnover but they show the most mobility. In Table 7-17, employer mobility is compared with the CEIC sample of individuals who claimed UI benefits at least twice between 1978 and 1982 and who were employed on both dates. On average, 69 per cent of this sample changed employers. But of the workers in this group between the ages of 21 and 25, 80 per cent did so. For workers between the ages of 56 and 65, only 46 per cent did so.

Occupation mobility is also highest for younger workers. The rate of occupation change for the same group of workers used for the employer mobility analysis is presented by age class in Table 7-17. The rate of change is calculated both for individuals who were with the same employer in 1978 and 1982 and for those who had changed employers. Whether they remain with the same employer or change employers, workers in the 21-25 age class have about a 10-percentage-point greater chance of changing occupations than workers in the 56-65 age class. But the amount of occupation change associated with changing employers (column 4), relative to that experienced by those remaining with the same employer (column 6), does not decrease across age classes (column 7). If anything, older workers show more "relative" flexibility here. Nevertheless, the data presented in Table 7-17 confirm the findings of other studies that older workers have developed both employer- and occupation-specific skills that contribute to decreased mobility.

The costs of adjustment associated with labour turnover will depend upon the manner in which the unemployment experience, the length of subsequent job tenure, and income change associated with job change vary across age classes. Data for each of these are

Table 7-18

Distribution of Post-Layoff Joblessness among Workers Losing Full-Time Jobs and Finding New Full-Time Jobs, by Age Group, Canada, 1981-85[1]

	All layoffs, classified by age group			Workers with three-year tenure upon layoff, classified by age group		
	20-24	25-54	55 and over	20-24	25-54	55 and over
			(Per cent)			
Number of jobless weeks:						
0-3	27.3	25.7	...	28.4	23.1	16.6
4-13	31.1	23.0	19.4	20.6	16.0	14.0
14-26	15.6	17.8	23.5	16.0	17.7	27.5
27-52	20.1	22.5	24.0	25.5	23.4	26.5
53 and over	5.9	10.8	...	9.5	19.7	15.4
Total	100.0	100.0	100.0	100.0	100.0	100.0

1 See note 1 of Table 7-6 for a discussion of the sample of laid-off workers.

SOURCE Picot and Wannell (1987), Table 6, p. 143; and unpublished data supplied by the authors.

available for layoffs – the separation category that probably best reflects the experience of workers who are forced to move as a result of structural change.

A high proportion of layoffs involve rather brief periods of unemployment. About 50 per cent of all layoffs over the period 1974-82 involve a subsequent jobless period of 13 weeks or less.[17] For nonreturn layoffs, more than half obtain new jobs in less than six months.[18] Table 7-18 presents the distribution of joblessness for workers who were laid off between 1981 and 1984. The data is based on a survey (see Picot and Wannell, 1987) carried out by Statistics Canada and reports the jobless experience of those who lost a full-

Table 7-19

Subsequent Job Tenure for Permanent Layoffs, by Sex and by Age Group, Canada, 1978[1]

	Both sexes, classified by age group				Males, classified by age group			
	17-24	25-54	55-64	All	17-24	25-54	55-64	All
				(Per cent)				
Years of continuous association:								
Less than 1	2.2	5.3	20.7	5.2	1.4	4.1	17.0	4.1
1	32.2	29.8	29.2	30.7	31.8	30.3	33.5	31.1
2	30.1	25.6	21.6	27.1	30.4	26.7	22.0	27.7
3	11.6	11.8	8.8	11.5	11.1	11.8	9.2	11.3
4	6.5	6.9	6.7	6.7	6.6	7.1	6.2	6.8
5 and over	17.4	20.6	13.0	18.8	18.7	20.0	12.1	19.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

1 Based on data from the Canada Employment and Immigration Commission's Record of Employment and Revenue Canada's administrative data (T4s). The file used for these calculations contains only the "continuously" employed (see Appendix D). It excludes persons who had no employment two years after a layoff.

SOURCE Data supplied by Labour Market Studies Division, Employment and Immigration Canada.

time job and subsequently found another full-time job but with another employer by 1985. The distributions cover all such workers and just those who had more than three years of tenure upon separation. In both samples, a greater proportion of younger than older workers experience jobless periods of less than 13 weeks. The reverse is true for the longest periods. The oldest workers fare worst for periods between six months and one year.

The costs of adaptation depend not just on length of search but also on the success of the search process. One such measure is the length of job tenure after displaced workers obtain their next job. The length of tenure for all workers in the permanent-layoff category in 1978 by age class is presented in Table 7-19. About 95 per cent of all workers in this group who find another job stay in it for more than one year, 65 per cent for two or more years. The 17-24 and 25-54 age classes have broadly similar distributions – though the younger group has a slightly greater inclination to leave after less than three years. The greatest difference occurs in the 55-64 age class where a very much larger percentage of workers hold a new job for less than one year.[19] Older workers, then, appear to be forced into a succession of casual or short-term jobs when permanently laid off.

The most striking difference between age classes occurs in the subsequent earnings history of permanently laid-off workers. Data on the percentage of workers who experience an increase in employment earnings in a subsequent job after a permanent layoff are presented in Table 7-20, column 7, for the period 1974-83.[20] On average, 52.8 per cent of all workers experience a gain in wages. The percentage does fluctuate with economic conditions. In the recession of the early 1980s, it fell below 50 per cent.

Table 7-20 also shows the performance of each age class relative to the mean. The youngest group (17-24) has a slightly higher percentage of workers obtaining an earnings increase after a permanent layoff than do all workers. The relative position of succeeding age classes progressively worsens. The worst experience is that of

Table 7-20

Record of Earnings in Next Job of Workers Permanently Laid Off, by Age Group, Canada, 1974-83[1]

	Age group[2]						Proportion of all age groups with wage increases in next job
	17-24 (1)	25-44 (2)	45-50 (3)	51-55 (4)	56-60 (5)	61-65 (6)	(7)
				(Ratio)			
1974	1.06	0.98	0.95	0.95	0.91	0.60	59.3
1975	1.07	0.99	0.98	0.96	0.88	0.53	58.0
1976	1.06	1.00	0.98	0.95	0.83	0.51	56.7
1977	1.07	0.97	1.00	0.94	0.87	0.48	55.6
1978	1.07	0.99	0.97	0.95	0.83	0.51	55.5
1979	1.08	0.98	0.97	0.92	0.82	0.48	54.0
1980	1.07	0.99	0.98	0.95	0.89	0.51	53.8
1981	1.05	1.00	0.98	0.97	0.89	0.53	49.5
1982	1.06	1.00	1.00	0.95	0.87	0.56	44.0
1983	1.07	0.99	1.00	1.01	0.92	0.59	41.4
Mean	1.06	0.99	0.98	0.96	0.87	0.53	...
Standard error of mean	0.002	0.003	0.005	0.008	0.011	0.013	...
Mean percentage experiencing an earnings increase	56.2	52.1	51.7	50.3	45.8	27.9	52.8
Standard error of mean	2.0	1.8	1.7	1.6	1.6	1.1	1.9

1 The table is based on earnings in the next job after a permanent layoff. The earnings are based on those listed on the Record of Employment form.

2 Ratio of the percentage of workers in an age group permanently laid off that experienced an increase in wages in the next job to the same percentage for all groups.

SOURCE Robertson (1987*a*), Table 18, p. 35.

the 61-65 age class where, on average, only 28 per cent experience a wage gain.[21] The relative position of each age class is remarkably stable over time, but the variability of the position of older workers is higher than that of the youngest classes. Thus, cyclical fluctuations in the economy fall more heavily on the older workers.

Conclusion

This chapter demonstrates that workers show considerable movement across employers, industries, and occupations when they separate from a job. The existence of mobility, it should be stressed, does not imply that adjustment is costless. That has not been the theme developed in this study. Rather, the proposition outlined in the introductory chapter and examined at length in Chapters 3 to 5 is that there is a relatively constant rate of turnover – resulting from firm decline and worker job search. Associated with this turnover are costs and benefits. The benefits, on the one hand, stem from efficiency gains at the firm level that are associated with the replacement of inefficient firms with more successful firms. Benefits are also associated with workers sorting themselves in such a way that they find jobs more closely matching their skills. The costs of this turnover are related to income loss during job search and the search costs themselves.

High mobility, then, is another characteristic associated with the constant turnover rate that has been outlined previously. By itself it does not indicate that the turnover process is relatively costless. But it does suggest that the workers who had separations associated with the relatively constant release of labour, industry by industry, are not so immobile that they unduly confine their search to the same industry, occupation, and geographical area.

The degree of mobility, like the normal or typical rate of firm exits or quits by workers, is likely to be affected by economic conditions – both economy-wide and industry-specific. Industry or sectoral decline may force workers to move further to find a new job. This may involve greater interregional, interindustry, or interoccupational change. But general economic conditions will also have an effect. With overall growth, there will be at least some sectors able to absorb worker separations in declining industries. When the economy is in recession, less overall movement is possible; although macro-conditions probably have more effect on the proportion of separations in a declining industry that find new jobs than on the distance (interregional or interindustry) that those who become re-employed have to travel.

At the moment, there is no evidence that will explain how mobility responds to these different forces. The previous chapters have shown that a large portion of job displacements, resulting from firm decline, quits, and other separations, are invariant to economic conditions. Since the mobility described here is associated with worker displacement, the most that can be done is to suggest that it too has a large stable component that reflects general search patterns that are only marginally affected by economic conditions. The similarity of the distribution of the industry of origin and destination that emerges from several case studies would support this contention – since economic conditions prior to entry and after exit would have differed substantially, given the length of time used in many of the industry-specific case studies.

8 Job and Worker Turnover by Firm Size Class

The previous chapters have focused on aggregate measures of change at the industry level using data on the number of worker separations and job changes at the producer level. This chapter disaggregates these measures by firm size class. By doing so, it provides a better understanding of the underlying dynamics of firm growth and decline.

The performance of firms in different size classes has received considerable attention in recent years (OECD, 1985, 1987). In part, this interest stems from a desire to understand better the nature of the competitive process. If large firms always remain large, and small firms do not grow to displace them, market structure is rigid and competition restricted to within-size-class but not between-size-class rivalry (Caves and Porter, 1977). In part, this interest is stimulated by the hypothesis that average establishment size is becoming smaller (see OECD, 1985) and by a desire to distinguish between two possible causes for this. The first is that large firms may be in decline; the second is that entry of small firms has been facilitated by new technology that reduces the advantage possessed by large firms.

The interest in job turnover by firm size class also has its roots in industrial policies that stress the need for assistance to small as opposed to large firms. Recent studies have focused on evidence that new jobs are heavily concentrated in small firms (Storey and Johnson, 1987*a*). Suggestions have been made that the potential for growth lies mainly in this sector. At the same time, the fact that exit rates are higher for small firms has been used to suggest that this sector suffers from particular problems that, if alleviated, might lead to higher rates of overall job creation; further, the high entry rates for this class would not then be counteracted by high death rates.

The difficulty with much of the literature is that statistics on growth and decline can all too often be used out of context. High exit rates for a particular size class do not by themselves bode ill, if entry rates offset them. High entry rates in one class do not imply overall job creation if firms in other size classes are being supplanted by growth in the first.

The impression has also been left that turnover is almost exclusively a small-firm phenomenon. Most commonly, this is the result of statements that the only size class in which firms are creating jobs is the smallest. These conclusions are often based on examination of net employment change, not gross change from expansion and contraction. Even if net growth is only positive for the smallest classes, turnover in the larger classes may be just as large as in the smaller classes.

The purpose of this chapter is to draw together the various data on job growth and decline by firm size class to demonstrate how extensive is the process of firm growth and decline that is at work in the Canadian economy. It is not just a small-firm phenomenon. Expansion and contraction are taking place in both large and small firms. The first section uses data drawn from the Census of Manufactures to examine how exit varies by firm size class. The second section examines the growth and decline process more generally using the LEAP file discussed in Chapter 4. The final section focuses on separations rather than job-change measures by size class.

Manufacturing Firm Exits by Size Class

Short-Run Firm Exit

In order to investigate differences in firm exit across size classes, the yearly exit data on firms in manufacturing developed in Chapter 3 are used. Firm exit may occur either through establishment closure or divestiture. The results reported in Chapter 3 suggest the two are quite different phenomena. Exit by closure occurs at a relatively constant rate year by year. Exit via merger is quite variable over time. Firms that exit by establishment closure were much smaller than those doing so by merger. Therefore, it is important, when examining the intensity of exits by firm size class, to treat each of the components separately.

The two components of exit can be compared on the basis of the distribution by firm size class of jobs affected by each. Average employment distributions for each class, calculated annually from 1971 to 1982, are presented in Table 8-1 (columns 1 and 2), along with the average distribution of firm employment for the period (column 3). Employment affected by firms that exited by closing their establishments is concentrated in the smaller classes; employment affected by divestiture, in the larger classes. The relative importance of firm exits by divestiture, when measured by employment affected, is given in column 4. The importance of divestitures increases by size class. It accounts for only some 11 per cent of all employment affected by firm exit in the smallest class but for 79 per cent in the largest class.

The percentage of employment in exits by closure that is located in the three smallest classes (column 2) is greater than the percentage of all employment in these classes (column 3). The same cannot be said of divestitures (cf. columns 1 and 3). Here the middle size classes account for a greater share of employment affected by divestiture than their share of all employment in continuing firms. Even though the largest size class has the highest percentage of employment affected by divestiture, it is still less than the percentage of total employment in this class. The reverse is true of the second largest class. Exits by closure, then, are concentrated at the low end and contribute to a decline in the importance of the smallest size classes. The effect of mergers, however, cannot be ascertained without an examination of the size class of the acquiring firm.

An earlier study on mergers (Baldwin and Gorecki, 1986*b*) found that a significant proportion of divestitures in any size class went to acquiring firms in the same size class. However, on balance the process led to a reallocation of employment from firms in the smallest classes to the largest. Recasting the earlier data on the basis of three size classes (1-99 employees; 100-499 employees, 500 and more employees), the smallest lost about 7 per cent of all jobs affected by mergers; the middle size class lost 8 per cent; and the largest gained about 15 per cent (ibid., Table 8, p. 53). Any tendency of large firms to decline over time will be cushioned by the merger process. This process has a disproportionate level of di-

Table 8-1

Average Annual Distribution of Employment Loss Associated with Firm Exit in the Manufacturing Sector, by Size Class, Canada, 1971-82

	Method of firm exit			
	By establishment divestiture (1)	By establishment closure (2)	All employment in continuing firms[1] (3)	Proportion of employment in exiting firms accounted for by divestiture (4)
		(Per cent)[2]		
Employment size class:				
1-19	1.8 (0.3)	21.8 (1.6)	4.2 (0.1)	11.0 (1.2)
20-99	17.8 (2.8)	41.7 (1.7)	14.8 (0.1)	38.0 (2.6)
100-499	32.7 (3.9)	22.4 (1.3)	18.9 (0.1)	68.0 (3.0)
500 and more	47.7 (6.2)	14.1 (3.0)	62.1 (0.3)	79.0 (7.2)
Total	100.0	100.0	100.0	60.0 (5.0)

1 Employment in continuing firms between adjacent years.
2 Mean percentage value of distribution calculated annually. Standard error of mean in parentheses.
Source Special tabulations provided by Statistics Canada.

vestiture activity in the classes below the largest – with a large percentage of the employment affected being shifted to the largest group.

Exit rates by establishment closure are highest for the smallest size classes and decline as the size class increases (Table 8-2, column 1). Firm exit rates by establishment divestiture, as measured by employment in divested firms divided by employment in the size class, do not follow a similar monotonic relationship (column 2). They are lowest for the smallest size class, and highest for the third size class (100-499 employees); but there is little difference between the second and fourth classes. The divestiture rates of the largest classes are the most variable when measured by the standard error of the mean rate for the size class. It is large-firm divestitures, rather than small-firm divestitures, that cause the high variability in the aggregate divestiture series.

In conclusion, exits affect the overall firm-size distribution in two ways. First, firms that leave by establishment closure tend to reduce the importance of the smallest classes. The percentage of employment in exiting firms in the smallest classes is greater than initial employment in these classes. It is much less in the largest classes. In contrast, divestiture is spread more evenly across size classes, with the marked exception of the smallest class where divestiture is relatively unimportant. However, there is evidence to suggest that divestitures generally move employment from firms in one size class to firms in a larger size class. *Ceteris paribus*, this will tend to reduce the extent to which large firms decline over time.

Table 8-2

Average Annual Rates of Job Loss from Firm Exit via Establishment Closure and Divestiture in the Manufacturing Sector, by Size Class, Canada, 1971-82

	Rate of job loss due to firm exit via establishment closure[1] (1)	Rate of job loss due to firm exit via establishment divestiture[2] (2)
	(Per cent)[3]	
Employment size class:		
1-19	5.6 (0.46)	0.7 (0.09)
20-99	3.2 (0.23)	2.0 (0.22)
100-499	1.4 (0.14)	3.0 (0.30)
500 and more	0.4 (0.06)	2.1 (0.60)
All size classes	1.2 (0.09)	2.2 (0.42)

[1] Jobs in firm exit via establishment closure divided by total employment in size class.

[2] Jobs in firm exit via establishment divestiture divided by total employment in size class.

[3] Mean percentage value calculated annually. Standard error of mean in parentheses.

SOURCE Special tabulations provided by Statistics Canada.

Longer-Run Firm Exit

The pattern of exit across size classes in the long run need not be the same as in the short run. In the latter, the smallest size classes may dominate exits, but in the longer run larger firms will decline and begin to exit as well. The period of study does not have to be lengthened by much before the difference in the importance of the exit rate by size class begins to disappear.

In order to show this, the detailed four-digit manufacturing industry database that compares establishment and firm status in 1970 and 1979 discussed in Chapter 3 was utilized. Establishments were grouped into firms at the four-digit level and the firm exit rate was calculated for five different size classes in each industry. The size classes were chosen so as to divide each industry into five groups, each with the same number of firms on the basis of shipment shares. Then the average exit rate for each class was calculated for all 167 industries.

This procedure avoids the aggregation bias that would result from the alternative of using fixed size classes (0-5 employees, 10-20 employees). Industries differ in terms of average establishment size and exit rates are higher in those industries with smaller average establishment size. If each industry's exit rate was calculated for the same classes, differences in these rates across size classes could arise because of differences in rates across industries as well as within industries.

The cumulative and implicit annual firm exit rates over the period from 1970 to 1979, for each size class, averaged across 167 industries, are reported in panel B of Table 8-3. Also presented for comparative purposes

Table 8-3

Short- versus Long-Run Exit Rates of Firms in the Manufacturing Sector, by Size Class, Canada, 1970s

	Employment size class					
	1-19	20-99	100-499	500 and more		All size classes
	(Per cent)					
Panel A: short-run rates[1]						
1 Distribution of employment in continuing firms	4.2	14.8	18.9	62.1		100.0
2 Mean annual exit rate	6.5	3.3	1.4	0.6		4.7
	Size class (quintiles)					
	1	2	3	4	5	All size classes
	(Per cent)					
Panel B: long-run rates[2]						
3 Distribution of employment by firm size	0.9	2.8	6.2	15.4	74.6	100.0
4 Cumulative exit rate	46.6	36.2	30.9	25.7	19.1	31.9
5 Implicit annual exit rate	6.7	4.9	4.0	3.2	2.3	3.1

1 The short-run rates were calculated, using firm numbers, between adjacent years with averages taken across the period 1971-82 for row 1 and 1971-81 for row 2. The rates were estimated using the manufacturing sector as the level of aggregation. Continuing firms exist between adjacent years; exits, via the closure of establishments, are classified in the manufacturing sector in one year but not the next. Size classes are based on the firms' employment.

2 The long-run rates, using firm numbers, are averages across 167 four-digit manufacturing industries, where the long run considers only 1970 and 1979. Exits, via the closure of establishments in a given industry, are classified to an industry in 1970 but not in 1979. The size classes were estimated as follows: all firms were ranked by shipments, largest to smallest; then the bottom or first quintile consists of the 20 per cent of firms ranked as having the lowest sales; the second quintile as the 20 per cent of firms having the next to lowest sales, and so on.

SOURCE Special tabulations provided by Statistics Canada.

are the short-run annual firm exit rates in panel A and the size distribution of firms in rows 1 and 3 for the short and long run, respectively. The implicit annual firm exit rates are 6.7 per cent in the smallest size class, 4.0 per cent in the middle size class, and 2.3 per cent in the largest size class. While there are still differences across size classes, they are less than the annual firm exit data suggest. This observation stresses the importance of looking at different time periods when drawing conclusions about the stochastic processes at work.

Job Turnover by Firm Size Class at the Sectoral Level

Previous chapters have shown that statistics measuring net employment change hide the amount of underlying labour turnover that occurs as firms grow and decline. A related point is made here. If only aggregate measures of the size distribution of firms are used to categorize the amount of competition taking place, the amount of intraindustry change is likely to be understated.

Considerable attention has been focused on summary statistics that characterize the overall firm-size distribution. Concentration ratios that measure the market share of the top four or eight firms have been used to suggest that market structure for the United States is relatively constant over time (Scherer, 1980). Similar results were obtained for Canada (Baldwin and Gorecki, 1989). However, when the impact of foreign trade is introduced, this is not the case for an open economy such as Canada (Baldwin et al., 1986). More comprehensive measures of the total size distribution also suggest relative stability in market structure. Inferences from these measures can all too readily be drawn that the competitive process is attenuated because large firms apparently are protected from decline.

This is not the conclusion drawn by all. Marshall likened the competitive process to a forest. Firms, like trees, grow and then die, though the forest remains outwardly the same. Hymer and Pashigian (1962) stressed that it is the changes in market shares of individual participants that need to be examined if the strength of competition is to be evaluated.

An examination of the effect of entry, exit, growth, and decline on different size classes, reveals the extent to which the underlying units change their relative importance. This cannot be done by comparing firm-size distributions for separate years. These distributions may remain relatively unchanged even though there is substantial shifting of relative position within each distribution as firms grow and decline. Instead, what is required is a longitudinal approach that classifies firms in one period on the basis of their size and then tracks these firms through time. This is the approach taken here using the data from the LEAP file, which is fully described and discussed in Chapter 4 and Appendix C.

Job turnover is studied for a period of eight years (1978 versus 1986) to reduce the impact of short-run cyclical effects. In the next section, this longer-run change is contrasted with the results obtained using annual changes over this eight-year period. It should be recalled that not all of the growth and decline that is caught here is new job creation or job destruction. Some will involve growth by merger or decline by divestiture.

The strength of the LEAP database is that it allows us to examine the job turnover process for a broad range of sectors in addition to manufacturing. These are mines, quarries, and oil wells (mines); construction; transportation, communications, and other utilities (transportation); wholesale trade (wholesale); retail trade (retail); finance, insurance, and real estate (finance); and community, business, and personal services (community services).[1] Because of the present nature of the database, conclusions are not drawn about intersectoral differences. Rather, it is used to show that the general process of growth and decline in all size classes takes place across all sectors.

Job Turnover in the Longer Run

The effect of growth and decline on different size classes over the period 1978-86 is presented in three ways. First, the origin of job creation is addressed by examining the distribution of the various components of job change across size classes and by comparing it to the original distribution of employment. Second, the effect of varying rates of job creation across size classes is examined. This is accomplished by tracking the importance of firms, which start in a given size class, over time. Finally, the impact of the growth and decline process on the size distribution of firms is detailed.

Over the eight-year period, 1978-86, entry and exit in the LEAP file accounts for about 40 per cent of total net job creation; the remainder is the result of the net effect of expansion and contraction in the continuing sector.[2] Attention is first devoted to entry and exit, then to the continuing sector. Finally, all firm turnover is considered.

Entry, Exit, and Job Turnover

The examination of the manufacturing sector in Chapter 3 found that, shortly before death and shortly after birth, establishments classified in each category were relatively small. Taken over a longer period, entrants that remained tended to grow. This suggests that entry affects more than just the smallest size classes – especially over the longer run. The LEAP file allows a more detailed examination of the differential effects of job change from entry and exits across size classes.

Since the LEAP file classifies entrants and exits by size class, the importance of each class in the entry and exit process can be estimated. This is done for the period 1978-86 in Table 8-4 for the economy as a whole (excluding public administration) and for eight sectors. Entrants are firms that existed in 1986 but not in 1978. Exits are those that existed in 1978 but not in 1986. For entrants (row 2 of each panel), the importance of a size class is measured as the percentage of total 1986 employment accounted for by entrants in that class; for exits (row 3 of each panel), it is the percentage of 1978 employment in all exits in that class. Entrants are assigned to the size class in which they first appeared; exits to their size class as of 1978. The importance of a size class as of 1978, measured in terms of its share of employment, is also presented (row 1 of each panel).

For the economy as a whole (all industries), entry is concentrated in the smaller size classes. The percentage of employment of all entrants in the two smallest classes is greater than the 1978 share of employment of these two size classes. The reverse is true for the two largest

Table 8-4

Proportion of Employment Affected by Firm Entry and Exit in Eight Sectors by Size Class, Canada, 1978-86[1]

	Employment size class						
	Less than 5	5-19.9	20-49.9	50-99.9	100-499.9	500 and more	Total
				(Per cent)			
Mines, quarries, and oil wells							
Employment share	**2**	**5**	**5**	**4**	**19**	**64**	**100**
Entry	31	19	13	7	24	6	100
Exit	6	12	12	12	25	33	100
Net	90	34	17	–6	22	–57	100
Manufacturing							
Employment share	**2**	**6**	**8**	**8**	**21**	**56**	**100**
Entry	26	24	13	8	14	14	100
Exit	4	12	15	15	32	22	100
Net	–148	–73	30	61	156	75	100
Construction							
Employment share	**19**	**23**	**16**	**11**	**18**	**13**	**100**
Entry	54	23	9	5	6	1	100
Exit	25	26	18	11	16	5	100
Net	280	5	–59	–34	–62	–30	100
Transportation, communications, and other utilities							
Employment share	**3**	**5**	**4**	**4**	**9**	**75**	**100**
Entry	45	21	11	5	9	9	100
Exit	16	20	16	11	20	16	100
Net	220	26	–24	–28	–63	–31	100
Wholesale trade							
Employment share	**9**	**21**	**18**	**13**	**23**	**16**	**100**
Entry	44	26	11	6	9	3	100
Exit	14	24	21	14	20	7	100
Net	2,328	204	–724	–598	–824	–287	100
Retail trade							
Employment share	**12**	**21**	**11**	**7**	**10**	**39**	**100**
Entry	47	30	11	5	5	2	100
Exit	28	33	15	9	11	5	100
Net	86	22	4	–2	–7	–5	100
Finance, insurance, and real estate							
Employment share	**7**	**11**	**7**	**5**	**12**	**59**	**100**
Entry	45	23	11	6	6	8	100
Exit	23	24	15	7	14	16	100
Net	107	21	1	3	–16	–16	100
Community, business, and personal services							
Employment share	**8**	**12**	**10**	**8**	**18**	**44**	**100**
Entry	38	26	15	7	9	5	100
Exit	20	27	18	11	13	10	100
Net	56	25	11	4	4	--	100
All industries							
Employment share	**7**	**12**	**10**	**7**	**17**	**47**	**100**
Entry	41	25	13	7	9	6	100
Exit	19	24	17	11	18	12	100
Net	99	30	2	–5	–16	–10	100

[1] **Employment share** is the 1978 share of sector employment accounted for by firms classified to each size class as of 1978. **Entry** is the share of 1986 employment of all entrants accounted for by entrants classified to each size class. Entrants are defined as firms which existed in 1986 but not in 1978. Entrants are classified to the size class in which they first appeared. **Exit** is the share of 1978 employment of all exits accounted for by exits classified to each size class. Exits are defined as firms which existed in 1978 but not in 1986. Exits are classified to their 1978 size class. **Net** is the ratio of entrant less exit employment for a given size class to total employment of all entrants less total employment of all exits. For all sectors except manufacturing the denominators of the ratio is positive. All industries excludes public administration.

SOURCE Special tabulations provided by Statistics Canada.

size classes. The two middle size classes on balance have a share of entry employment that is about the same as their share of 1978 employment. Much the same pattern holds for the individual sectors. It is true that in mines and, to a lesser extent, manufacturing, some of the larger size classes have as large a share of entry employment as the smaller size classes. But even here, the share of entry employment accounted for by the larger size classes is generally less than their employment share in 1978.

While exits are more equally spread across all size classes than entry for the whole economy, exit is still concentrated in the smallest size classes. They account for a larger share of all employment in exits than their 1978 share of employment. At the individual industry level, there is much more variance in the pattern of the share of exits than there is for entry. Mines and manufacturing have relatively large exit shares for some larger size classes; but exit shares for the largest size class are always less than the corresponding employment shares in 1978.

Table 8-4 also contains the distribution of the net effect of entry minus exit in each size class (row 4 of each panel). For the economy as a whole, entry and exit have a positive effect on employment in the three smallest size classes, but a negative one for the rest. At the individual sector level, there is generally a similar finding. In those sectors where the larger size classes have positive job creation from the net effect of entry and exit, their share of this job creation is usually less than their share of 1978 employment.

Continuing Firm Job Turnover by Size Class

Entry and exits alone are not the only determinant of changes going on within the size distribution. The importance of growth and decline for continuing firms by size class must also be investigated (Table 8-5, rows 2 and 3 of each panel). As with the entry and exit comparison, a relatively long period (1978-86) was used to classify firms into two categories so as to reduce the impact of short-run cyclical effects. For continuing firms, the importance of a size class is measured by the ratio of employment growth (or decline) in firms over the 1978-86 period that were in the size class in 1978 relative to total employment growth (or decline) in all firms that continued from 1978 to 1986. As before, the overall distribution of employment in 1978 is presented for comparison (row 1 of each panel).

For all sectors combined, the share of continuing firm growth in the two smallest size classes is greater than the share of 1978 employment found in these classes. The next two size classes account for about the same percentage of growth as they did of 1978 employment. The largest size class has a lower share of growth than of employment in 1978. The same results generally apply to the individual sectors. Retail and wholesale are two exceptions where the largest size class has about the same growth as its 1978 employment share.

In contrast to the results for employment growth, employment decline is spread across size classes for the all-industry sector much more evenly. The share of decline is about the same as the share of 1978 employment for each size class. In the mines, manufacturing, construction, transportation, and wholesale sectors, the share of firm decline in the largest size class is greater than its share of 1978 employment; in the other sectors, it is lower.

The net effect of growth minus decline in continuing firms is also presented in Table 8-5 (row 4 of each panel). The two smallest size classes gain more than their share of 1978 employment; the largest gains less. This result is primarily caused by differences in growth shares rather than differences in declining employment shares across size classes. This holds across all sectors. The process that leads to growth and decline of firms generally benefits the smallest firms at the expense of the largest.

Growth and decline in the continuing segment, then, lead to small-firm growth and large-firm decline. In Table 8-6, the average size of firms in 1978 is compared to the average size of firms that grew or declined by 1986. Growing firms were, on average, smaller than the mean; declining firms were larger than the mean. The exceptions occur in the two service sectors (finance and community services). The same effect can also be found within size classes where the average size of a declining firm was generally larger than for a growing firm.

Job Turnover in All Firms

It is the combined effect of the net change due to entry and exit and the net change due to the growth and decline process in the continuing segment that determines whether firms in a given size class at a point in time increase or decrease their relative importance. This is presented in Table 8-7 (row 4 of each panel). The net change due to entry and exit and to continuing firm change, taken from Tables 8-4 and 8-5, are repeated for the purposes of comparison to the overall net change

Table 8-5

Proportion of Employment Growth and Decline in Continuing Firms in Eight Sectors, by Size Class, Canada, 1978-86[1]

	Employment size class						
	Less than 5	5-19.9	20-49.9	50-99.9	100-499.9	500 and more	Total
				(Per cent)			
Mines, quarries, and oil wells							
Employment share	**2**	**5**	**5**	**4**	**19**	**64**	**100**
Growing	9	16	5	5	22	43	100
Declining	1	4	3	2	18	71	100
Net	33	55	12	14	31	–45	100
Manufacturing							
Employment share	**2**	**6**	**8**	**8**	**21**	**56**	**100**
Growing	9	14	14	11	25	27	100
Declining	1	4	6	6	18	66	100
Net	80	105	91	59	94	–328	100
Construction							
Employment share	**19**	**23**	**16**	**11**	**18**	**13**	**100**
Growing	38	25	14	7	11	5	100
Declining	11	20	15	11	18	25	100
Net	188	51	7	–15	–27	–104	100
Transportation, communications, and other utilities							
Employment share	**3**	**5**	**4**	**4**	**9**	**75**	**100**
Growing	14	15	14	9	15	32	100
Declining	1	4	3	2	5	85	100
Net	–12	–9	–9	–5	–6	141	100
Wholesale trade							
Employment share	**9**	**21**	**18**	**13**	**23**	**16**	**100**
Growing	20	22	13	9	20	16	100
Declining	7	20	19	13	22	19	100
Net	35	25	6	4	17	13	100
Retail trade							
Employment share	**12**	**21**	**11**	**7**	**10**	**39**	**100**
Growing	17	17	8	5	12	41	100
Declining	9	24	12	7	10	38	100
Net	23	13	6	4	13	42	100
Finance, insurance, and real estate							
Employment share	**7**	**11**	**7**	**5**	**12**	**59**	**100**
Growing	14	13	7	8	15	43	100
Declining	7	15	10	7	15	46	100
Net	19	11	5	9	16	41	100
Community, business, and personal services							
Employment share	**8**	**12**	**10**	**8**	**18**	**44**	**100**
Growing	17	13	9	8	21	31	100
Declining	8	18	16	10	17	32	100
Net	21	11	6	7	24	31	100
All industries							
Employment share	**7**	**12**	**10**	**7**	**17**	**47**	**100**
Growing	17	16	10	8	19	31	100
Declining	5	12	10	7	15	51	100
Net	33	20	11	9	25	1	100

[1] For a definition of **employment share**, see Table 8-4. **Growing** is defined as the percentage of the net increase in employment of continuing growing firms accounted for by each size class. A continuing growing firm is one which exists in 1978 and 1986, with employment larger in the latter year. Firms are assigned to their 1978 size class. **Declining** is defined as the percentage of the net decrease in employment of continuing declining firms accounted for by each size class. A continuing declining firm is one which exists in both 1978 and 1986, with employment larger in the former year. Firms are assigned to their 1978 employment size class. **Net** is the percentage of continuing growing firm employment change less continuing declining firm employment change accounted for by a given size class. For all sectors except transportation, communications, and other utilities the denominator of the ratio is positive. All industries excludes public administration.

SOURCE Special tabulations provided by Statistics Canada.

distribution. For all sectors, both processes tend to increase the relative importance of the smallest size classes and decrease the larger ones. The share of the combined net effect (row 4 of each panel) in the smallest class is greater than its share of 1978 employment. The differences are most pronounced for the entry and exit category (row 2 of each panel). However, since this category generally contributes less than the continuing establishment category (row 3 of each panel) to total net employment growth, the combined effect is somewhat closer to that of the latter than the former. Nevertheless, the combined effect of entry and exit and growth and decline in continuing firms in all sectors (row 4 of each panel) is to increase the share of the two smallest size classes and to decrease it in the top four. These conclusions generally also hold for each of the sectors, except that in some cases the third or fourth size classes may also contribute slightly more to net job growth than they do to employment in 1978.

Growth and decline, then, move small firms up at the expense of larger firms. A more explicit measure of the extent to which this occurs may be obtained by comparing the relative importance of firms that started in a particular size class in 1978 to their relative importance as of 1986. Once more, a period of eight years is chosen so as to reduce the importance of short-run cyclical effects and to capture longer-run intraindustry structural change (Table 8-8). The first row for each industry contains the distribution of employment of firms by size class in 1978. The second row gives the importance of the firms that were in a given size class in 1978 on the basis of their 1986 employment. Thus, for all sectors, firms that had less than five employees in 1978 accounted for 7 per cent of employment in that year; but these firms had grown until by 1986 they accounted for 15 per cent of employment. It should be noted that many would no longer have been in the size class to which they belonged in 1978. Entrants are classified to the size class in which they first started, but are measured on the basis of their 1986 employment.

For all sectors, the two smallest size classes gain, the four largest lose. The smallest class gains about 8 percentage points of total employment; the largest class loses about 7 percentage points. This translates into more than a 100 per cent gain in share for firms in the smallest class and a 15 per cent decrease for firms in the largest class. These results present a picture of net growth of the smallest firms and net decline on the part of the largest in 1978. This does not necessarily mean the overall size distribution of firms has been changing. The size distribution of firms may be bounded below and above in such a way that random movements in firm size will produce the above results. If there is a similar random process in each size class that causes some firms to grow and others to decline, the smallest size classes then will exhibit positive net growth, because downward movements are bounded by zero. Economic constraints on the size of the largest firms will do the reverse for these classes. The middle size classes will show no net growth. In this situation, a stable distribution over time may well be expected. As firms in the largest size class decline, some firms in the smaller classes move up to replace them; as smaller firms grow, those in the larger classes move down leaving the overall size distribution unchanged.

The distribution of employment by firm size class for the years 1978, 1982, and 1985 is presented in Table 8-9. The data indicate that the firm-size distributions are relatively constant. While a slight change occurred in the post-1982 recession period, it is too early to tell whether this is a permanent shift or a temporary phenomenon.

Table 8-6

Average Size of Continuing Firms that Grew or Declined in Eight Sectors, Canada, 1986 Relative to 1978

	Average size of firm that grew (1)	Average size of firm that declined (2)	Average size[1] (3)
	(Number of employees in 1978)		
Mines, quarries, and oil wells	46.0	85.8	64.1
Manufacturing	49.5	103.3	72.3
Construction	5.5	11.2	8.0
Transportation, communications, and other utilities	32.3	99.8	60.8
Wholesale trade	13.6	20.2	16.6
Retail trade	16.0	16.1	16.0
Finance, insurance, and real estate	26.0	19.0	23.0
Community, business, and personal services	23.1	17.8	21.0
All industries[2]	20.3	27.0	23.1

1 Calculated for those firms continuously identified over the period 1978-86.

2 Excludes public administration.

SOURCE Special tabulations provided by Statistics Canada.

Table 8-7

Proportion of Net Employment Change Affected by Entrants, Exits, and Continuing Firms in Eight Sectors, by Size Class, Canada, 1978-86[1]

	Employment size class						
	Less than 5	5-19.9	20-49.9	50-99.9	100-499.9	500 and more	Total
				(Per cent)			
Mines, quarries, and oil wells							
Employment share	**2**	**5**	**5**	**4**	**19**	**64**	**100**
Entry/exit net	90	34	17	–6	22	–57	100
Continuing net	33	55	12	14	31	–45	100
Total net	57	46	14	5	27	–50	100
Manufacturing							
Employment share	**2**	**6**	**8**	**8**	**21**	**56**	**100**
Entry/exit net	–148	–73	30	61	156	75	100
Continuing net	80	105	91	59	94	–328	100
Total net	–1,955	–1,473	–454	78	644	3,260	100
Construction							
Employment share	**19**	**23**	**16**	**11**	**18**	**13**	**100**
Entry/exit net	280	5	–59	–34	–62	–30	100
Continuing net	188	51	7	–15	–27	–104	100
Total net	239	25	–30	–26	–47	–62	100
Transportation, communications, and other utilities							
Employment share	**3**	**5**	**4**	**4**	**9**	**75**	**100**
Entry/exit net	220	26	–24	–28	–63	–31	100
Continuing net	–12	–9	–9	–5	–6	141	100
Total net	–46	–14	–7	–2	33	166	100
Wholesale trade							
Employment share	**9**	**21**	**18**	**13**	**23**	**16**	**100**
Entry/exit net	2,328	204	–724	–598	–824	–287	100
Continuing net	35	25	6	4	17	13	100
Total net	97	30	–14	–12	–5	5	100
Retail trade							
Employment share	**12**	**21**	**11**	**7**	**10**	**39**	**100**
Entry/exit net	86	22	4	–2	–7	–5	100
Continuing net	23	13	6	4	13	42	100
Total net	44	16	6	2	6	26	100
Finance, insurance, and real estate							
Employment share	**7**	**11**	**7**	**5**	**12**	**59**	**100**
Entry/exit net	107	21	1	3	–16	–16	100
Continuing net	19	11	5	9	16	41	100
Total net	39	13	4	8	9	28	100
Community, business, and personal services							
Employment share	**8**	**12**	**10**	**8**	**18**	**44**	**100**
Entry/exit net	56	25	11	4	4	--	100
Continuing net	21	11	6	7	24	31	100
Total net	37	17	9	5	15	17	100
All industries							
Employment share	**7**	**12**	**10**	**7**	**17**	**47**	**100**
Entry/exit net	99	30	2	–5	–16	–10	100
Continuing net	33	20	11	9	25	1	100
Total net	61	25	8	3	8	–4	100

[1] For a definition of **employment share**, see Table 8-4. For **entry/exit net**, see the definition of net in Table 8-4. The denominator of the ratio is positive for all sectors except manufacturing. For **continuing net**, see the definition of net in Table 8-5. The denominator of the ratio is positive for all sectors except transportation, communications, and other utilities. **Total net** is the percentage of the increase in employment between 1978 and 1986 because of continuing growing firms and entrants less the decline in employment because of continuing declining firms and exits accounted for by a given size class. See notes to Tables 8-4 and 8-5 for further definitions of terms. The denominator of the ratio is positive for all sectors except manufacturing and transportation, communications, and other utilities. All industries excludes public administration.

SOURCE Special tabulations provided by Statistics Canada.

In conclusion, Marshall's analogy of the firm growth and decline process to the growth and decline of trees in the forest is appropriate for the eight-year period chosen for investigation here. Small firms grow and large firms wither; but changes in the overall appearance of the population are barely perceptible. Those who infer that the underlying dynamics of the process are relatively static from this outward appearance are likely to underestimate the degree of intraindustry change in firm rankings that have been taking place.

The Difference between Short- and Long-Run Job Turnover

The previous section adopted an eight-year period to examine turnover for different size classes of firms in order to reduce the effect of short-run cyclical movements. As such, it provides a measure of longer-run change in firm position within an industry. However, the adoption of a long-run perspective misses a considerable amount of change. Some firms will have entered after

Table 8-8

Effect on Firms in a Given Size Class in 1978 of Subsequent Entry, Exit, Growth, and Decline by 1986, Eight Sectors, Canada[1]

	Employment size class						
	Less than 5	5-19.9	20-49.9	50-99.9	100-499.9	500 and more	Total
				(Per cent)			
Mines, quarries, and oil wells							
1978	2	5	5	4	19	64	100
1986	9	10	6	5	20	50	100
Manufacturing							
1978	2	6	8	8	21	56	100
1986	6	9	9	7	20	49	100
Construction							
1978	19	23	16	11	18	13	100
1986	36	23	13	8	13	7	100
Transportation, communications, and other utilities							
1978	3	5	4	4	9	75	100
1986	8	7	6	4	10	65	100
Wholesale trade							
1978	9	21	18	13	23	16	100
1986	19	22	15	10	19	15	100
Retail trade							
1978	12	21	11	7	10	39	100
1986	20	20	10	6	9	36	100
Finance, insurance, and real estate							
1978	7	11	7	5	12	59	100
1986	13	11	6	5	11	53	100
Community, business, and personal services							
1978	8	12	10	8	18	44	100
1986	16	13	10	7	17	37	100
All industries[2]							
1978	7	12	10	7	17	47	100
1986	15	14	9	7	15	40	100

1 The table compares the relative share of firms in a given size class in 1978 to their share as of 1986 as a result of entry, exit, growth, and decline. Entrants are assigned to the size class in which they first appeared. Exits and continuing firms are assigned to their 1978 size class.

2 Excludes public administration.

SOURCE Special tabulations provided by Statistics Canada.

Table 8-9

Distribution of Firm Employment in Eight Sectors, by Size Class,[1] Canada, 1978, 1982, and 1985

	Employment size class						
	Less than 5	5-19.9	20-49.9	50-99.9	100-499.9	500 and more	Total
				(Per cent)			
Mines, quarries, and oil wells							
1978	2	5	5	4	19	64	100
1982	2	5	5	5	18	65	100
1985	3	6	6	6	20	59	100
Manufacturing							
1978	2	6	8	8	21	56	100
1982	2	6	8	7	22	55	100
1985	2	7	8	8	22	53	100
Construction							
1978	19	23	16	11	18	13	100
1982	19	21	15	11	18	17	100
1985	21	25	16	11	17	19	100
Transportation, communications, and other utilities							
1978	3	5	4	4	19	75	100
1982	4	6	5	4	10	72	100
1985	4	6	5	4	11	69	100
Wholesale trade							
1978	9	21	18	13	23	16	100
1982	10	22	18	12	22	17	100
1985	9	21	18	12	22	18	100
Retail trade							
1978	12	21	11	7	10	39	100
1982	12	20	11	6	8	42	100
1985	12	21	11	7	10	39	100
Finance, insurance, and real estate							
1978	7	11	7	5	12	59	100
1982	8	10	7	5	12	59	100
1985	8	10	7	5	12	58	100
Community, business, and personal services							
1978	8	12	10	8	18	44	100
1982	9	12	10	7	18	44	100
1985	9	13	10	8	18	43	100
All industries[2]							
1978	7	12	10	7	17	47	100
1982	8	12	9	7	16	47	100
1985	9	13	10	8	17	44	100

1 The table presents for various years the size distribution of firms. In other words, a firm is classified in a given size class in 1978 (and 1982 and 1985) on the basis of its employment in that, and not some other, year.

2 Excludes public administration.

SOURCE Special tabulations provided by Statistics Canada.

1978 and left before 1986. The job turnover estimated from long-run exit and entry data will miss this component. There will also be considerable short-run movements in the continuing firm sector that are partially or fully reversed within the eight-year period. Chapter 3 showed both sources, but particularly the latter, increase the annual short-run measures of job gain and loss relative to the implicit annual rates derived from long-run change.

Since short-run change is partially transitory as far as the firm is concerned, an examination of structural change in firm sizes is best done using longer-run data. By way of contrast, if the implication of job change at the firm level for labour force displacement is the focus of attention, then it is the short run that is relevant; for it was demonstrated in Chapter 6 that it was the year-to-year job-loss rate at the sectoral level that approximated the rate at which workers were permanently laid off in that sector. For this reason, the distribution of job change by size class in the short run is examined in this section.

There is a second reason for more careful examination of the distribution of change in the short run. In the first section, it was demonstrated that the concentration of exit found in smaller size classes, when short-run data were used, decreased when a longer perspective was adopted. The existence of a similar phenomenon is investigated here. It is a comparison of the results of the longer and shorter time periods that provided evidence on the type of stochastic process at work. In the short run, smaller firms have a higher probability of exit. In the long run, larger firms have declined until they too begin to exit with greater frequency. A comparison of the two results demonstrates how rapidly the contraction process begins to affect exit in the larger size classes.

In order to provide a picture of change in the short run, this section examines the year-to-year distribution of the components of job change by firm size class over the period 1978-86 using the LEAP file and compares it to the longer-run results for the entire period. For the sake of brevity, only manufacturing is examined. Attention is paid to the distribution of job change calculated annually and to the annual rates of change in each size class.

Job Loss

The distribution of the components of gross job loss, from declining firms, from exits, and from both together, is presented in Table 8-10. In addition to the averages of annual data for 1978 to 1986, the distribution of long-run change obtained by comparing firms in 1986 to 1978 is given. The initial distribution of employment in 1978 is also included.

A comparison of the annual distributions of job contraction in continuing firms to the longer run changes that occurred over the 1978-86 period shows major differences between the two (Table 8-10, panel B). The smaller size classes increase in relative importance when short-run data is used. The largest size classes decline in importance. Moreover, in the short run, the loss proportions in the small classes are greater than the employment share in these groups; in the longer run, the situation is reversed. There are two possible reasons for this. First, a smaller percentage of job change may be transitory in the smaller classes. What is probably more important is that the lower boundary of zero employment serves to limit more severely the amount of decline for firms in the smaller size classes relative to firms in the larger classes as the period of measurement is lengthened from one to eight years.

Similar differences between the distributions of short- and long-run change exist with regard to exits (Table 8-10, panel C) – though the middle size classes increase in importance in the long run. In the longer run, contracting firms in the middle size classes have had a chance to decline to the point that they exit. Interestingly, the largest class accounts for a lower percentage of all exits in the long run than in the short run. This probably reflects the fact that the effect of some mergers is included in the LEAP file, and the largest size classes are differentially affected by mergers. In earlier work (Baldwin and Gorecki, 1986*b*), it was reported that the largest size class gains employment as a result of merger activity.

When job losses in declining firms and from exits are combined (Table 8-10, panel A), change is still shifted away from small classes in the long run, but much less markedly. And even then, the smaller classes account for a larger proportion of total job loss than their share of employment. But the combined effect, as indicated, hides quite different relationships in the two components of job change and, therefore, should not be used to infer the degree of structural change that is occurring within firm-size distributions.

These differences lead to two conclusions. Since short-run job loss is distributed quite differently from long-run change, inferences about the long run should not be drawn from the short run. In particular, the fact that year-to-year change in small size classes is greater than the employment share of these classes does not imply most long-term change comes from this sector. Indeed, in the long run, contractions from larger firms are much more important, relatively speaking.

Table 8-10

Annual Average and Long-Run Distribution of Job Loss and Gain in Continuing, Exiting, and Entering Firms in the Manufacturing Sector, by Size Class, Canada, 1978-86[1]

	Employment size class						
	Less than 5	5-19.9	20-49.9	50-99.9	100-499.9	500 and more	Total
				(Per cent)			
Employment share	**2**	**6**	**8**	**8**	**21**	**56**	**100**
Distribution of gross job loss and its components:							
Panel A							
Gross job loss							
Annual average	4	9	11	10	24	42	100
1978-86	3	8	10	10	25	44	100
Panel B							
Continuing declining firms							
Annual average	4	8	10	9	23	46	100
1978-86	1	4	6	6	18	66	100
Panel C							
Exits							
Annual average	7	12	14	12	31	24	100
1978-86	4	12	15	15	32	22	100
Distribution of gross job gain and its components:							
Panel D							
Gross job gain							
Annual average	10	14	13	10	23	30	100
1978-86	16	18	14	10	20	22	100
Panel E							
Continuing growing firms							
Annual average	9	14	13	10	23	31	100
1978-86	9	14	14	11	25	27	100
Panel F							
Entrants							
Annual average	13	18	14	10	23	21	100
1978-86	26	24	13	8	14	14	100

[1] For a definition of **employment share**, see Table 8-4. **Annual average** is, for each category of employment change, its distribution across the size classes calculated for 1978-79, 1979-80, . . ., 1985-86. The average is then estimated for each size class. Firms are assigned to their base-year employment size class (e.g., for 1978-79 this would be 1978). **1978-86** is, for each category of employment change, its distribution across size categories calculated using 1978 and 1986 only. Firms are assigned to their 1978 size class; entrants to their initial size class.

SOURCE Special tabulations provided by Statistics Canada.

Second, the differences between short- and long-run distributions demonstrate the extent of underlying structural change in firm positions within a relatively constant overall firm-size distribution. In the long run, large firms do decline markedly, and exit becomes more important in the middle size classes.

Until now, job loss has been examined by estimating the share of total job loss and its components accounted for by various size classes. Attention, instead, can be focused on the rate of job loss by size category. Table 8-11 shows that in the smaller size classes the mean short-run loss rates are higher than the longer-run rates. Moreover, the increase in percentage points between the largest and the smallest class for the short-term rates of decline is about the same for both continuing firms (panel B) and exits (panel C). This is not the case in the longer run. The implicit annual rates for declining firms are higher for the larger classes than for the smaller ones, but the exit rates follow the opposite pattern. This reflects the fact that, in the longer run (eight years here), a greater proportion of unsuccessful firms in the smaller classes will have exited; those remaining will be the more successful, and any decline that they have suffered will more likely be transitory. On the other hand, in the larger classes, unsuccessful firms will still be in the process of declining and a smaller percentage will have exited.

In Chapter 3, it was noted that the industry-wide annualized exit rates in both the short and long run were about the same, with the latter slightly higher. Higher long-run rates were taken to mean that exit was not restricted just to the smallest size classes. Higher long-run rates suggest that, as time passes, larger and larger establishments are exiting. Panel C of Table 8-11 shows that this relationship between average short-run and long-run exit rates also generally holds across the different size classes. In particular, in all size classes, except the largest, the long-run implicit annual exit rate is higher than the average short-run exit rate. This is particularly the case in the middle size classes. All of this provides corroborative evidence for the general decline process. Even within size classes, larger and larger firms are exiting in the eight-year period used here for the calculation of long-run exit rates.

Job Gain

The long-run (1978-86) and short-run (annual) distributions of job gain in expanding firms show few significant differences (Table 8-10, panel E). The largest size class is less important in the longer run, as one might expect if there was a ceiling on firm size. It is generally the middle size classes that do slightly better in the longer run. But differences between the short- and long-run distributions of job gains are relatively minor, compared to the distributions of job loss where decline in large firms increased dramatically in importance in the long run.

A more striking difference between long- and short-run distributions on the growth side comes from job growth due to entry (Table 8-10, panel F). The smaller classes have become more important in the long run due to the fact that entrants start small but grow rapidly after entry – at least in the initial years. Overall, the latter effect dominates so that the same result applies to total or gross job gain from both continuing firms and entering firms (panel D). But this pattern in gross job gain is being driven by the dynamics of post-growth entry, not of growth in the continuing sector. Entry is the most dynamic force leading to change in the relative position of smaller firms on the job growth side when long- as opposed to short-run results are compared.

A comparison of the distribution of the long and short run also reveals the extent to which individual firms are moving up and down within the relatively stable overall distribution. For both job growth in continuing firms and from new firms, the largest size class loses relative share when longer-run comparisons are made. Once more this suggests large firms face ceilings on their size.

An examination of the relative rates of job growth, as opposed to the distribution of job growth, corroborates the extent to which there is intraindustry change. As was the case with the total job-loss rates, the annual job-gain rates for continuing firms are higher for the smaller classes than for the larger ones (Table 8-11, panel E). But the differential is much greater for job growth in continuing firms than for job loss (panel B). Once more, this confirms that the growth and decline processes differ markedly.

Table 8-11 also contains, for continuing growing firms, the implicit annual growth rate derived from long-run changes. It is lower than the average short-run change rate for all classes. The ratio of the average short-run to long-run rate is highest for the smallest and the largest classes. For the smallest class, there is an element of unsustainability in growth because of the newness of firms in this class. For the largest class, it is probably the result of the ceiling on firm size. In the four middle size classes, the ratio of the average short-run to long-run rate was generally the same. This indicates the forces that lead to a slowdown of the high rates of short-run growth are about the same in the middle of the size distribution, as it should be if these firms have not yet run up against the ceiling on size.

The annual entry rates for the different size classes are presented in both Table 8-11, panel F (means only), and Table 8-12, along with the long-run rates for the period from 1978 to 1986. Of interest is the difference between

Table 8-11

Annual Average and Long-Run Rate of Job Loss and Gain in the Manufacturing Sector, by Size Class, Canada, 1978-86[1]

	Employment size class						
	Less than 5	5-19.9	20-49.9	50-99.9	100-499.9	500 and more	All size classes
				(Per cent)			
Decline rates for gross job loss and its components:							
Panel A							
Gross job loss							
Annual average	18.2	13.0	11.8	11.1	9.9	6.8	8.5
1978-86	52.5	45.1	42.6	43.5	37.3	25.3	32.2
Implicit annual rate	8.9	7.2	6.7	6.9	5.7	3.6	4.7
Panel B							
Continuing declining firms							
Annual average	12.3	9.9	9.1	8.6	7.6	6.1	7.2
1978-86	10.5	11.9	11.8	12.2	13.5	19.2	16.3
Implicit annual rate	1.4	1.6	1.6	1.6	1.8	2.6	2.2
Panel C							
Exits							
Annual average	5.9	3.1	2.7	2.5	2.3	0.8	1.6
1978-86	42.0	33.3	30.9	31.3	23.8	6.2	15.9
Implicit annual rate	6.6	4.9	4.5	4.6	3.3	0.8	2.1
Growth rates for gross job gain and its components:							
Panel D							
Gross job gain							
Annual average	44.2	20.3	14.1	11.8	9.5	5.0	8.9
1978-86	316.0	103.9	55.7	41.2	30.6	12.3	31.9
Implicit annual rate	19.5	9.3	5.7	4.4	3.4	1.5	3.5
Panel E							
Continuing growing firms							
Annual average	35.6	16.5	11.9	10.1	8.1	4.4	7.6
1978-86	96.2	44.8	32.4	26.0	21.3	8.8	18.1
Implicit annual rate	8.8	4.7	3.6	2.9	2.4	1.1	2.1
Panel F							
Entrants							
Annual average	8.6	3.8	2.1	1.7	1.4	0.6	1.3
1978-86	220.1	59.1	23.3	15.2	9.3	3.5	13.9
Implicit annual rate	15.7	6.0	2.6	1.8	1.1	0.4	1.6

[1] **Annual average** is, for each category of employment change, the job gain or loss for each size category for each year measured relative to base-year employment. The mean of the job gain or loss rate for each size class for 1978-79, 1979-80, . . ., 1985-86 is then derived. Firms are assigned to their base-year employment size class (e.g., for 1978-79 this would be 1978). **1978-86** is, for each category of employment change, the rate of job gain or loss for each size category calculated using 1978 and 1986 only. Firms are assigned to their 1978 size class; entrants to their initial size class. Job loss or gain is measured relative to 1978 size class employment. **Implicit annual rate** is the rate of job loss or gain derived from those for 1978-86 immediately above.

SOURCE Special tabulations provided by Statistics Canada.

Table 8-12

Firm Employment Entry Rates in the Manufacturing Sector, by Size Class, Canada, 1978-86

	Employment size class						
	Less than 5	5-19.9	20-49.9	50-99.9	100-499.9	500 and more	All size classes
				(Per cent)			
Entry rate:[1]							
1978-79	9.0	4.7	2.5	1.9	1.7	0.9	1.6
1979-80	9.4	3.8	1.9	1.3	1.1	0.6	1.2
1980-81	8.5	3.6	1.8	1.3	1.1	0.3	1.0
1981-82	6.8	3.0	1.7	1.1	0.9	0.1	0.8
1982-83	8.2	3.7	2.1	2.0	1.0	0.3	1.1
1983-84	8.6	3.8	2.2	2.0	1.9	1.3	1.9
1984-85	9.1	3.8	2.8	2.6	1.5	0.7	1.6
1985-86	9.2	3.9	2.0	1.6	1.7	0.2	1.2
Mean	8.6	3.8	2.1	1.7	1.4	0.6	1.3
1978-86	220.1	59.1	23.3	15.2	9.3	3.5	13.9
Implicit annual rate	15.7	6.0	2.6	1.8	1.1	0.4	1.6
Ratio of entrants' size as of 1985 to sum of initial size of entrants for each year, 1978-85[2]	2.61	1.72	1.27	1.10	0.89	0.89	...
Ratio of entrants' size as of 1985 to "expected" size of entrants as of 1985[3]	1.60	1.58	1.28	1.14	0.97	0.96	...

1 Calculated relative to base-year employment in the size class.

2 The denominator is the sum of the size of all entrants for the years 1978-79, 1979-80, . . ., 1984-85, where an entrant is defined as a firm which exists in, say, 1979 but not in 1978. The numerator is the sum of the size of all entrants in 1985 that entered (and survived) between 1978 and 1985 – they existed in 1985 but not in 1978.

3 Expected size is calculated using the rate of employment change in a size class due to growth and decline of continuing firms and exits. Entrants are defined as those that existed in 1985 but not 1978. For more details, see text.

SOURCE Special tabulations provided by Statistics Canada.

the mean of the short-run entry rates and the implicit annual rate derived from comparing endpoints in 1978 and 1986. As was observed in Chapter 3, the long-run entry rate is slightly higher than the short-run rate for the manufacturing sector as a whole. Growth of entrants subsequent to entry more than offsets exits and decline in recent entrants. There is, however, a considerable difference in the relationship between the long- and short-run entry rates across size classes. The long-run rates are above the short-run rates for the four smallest classes, and below for the two largest. In the longer run, entrants in the smallest class have an accelerated rate of growth relative to the larger classes and fewer exits and less decline.

A different way of portraying this phenomenon is found in the second last line of Table 8-12. The size in 1985 of successful firms created between 1979 and 1985 (those still in existence as of 1985) is divided by the sum of employment in all entrants as of the first year of their existence. This ratio indicates how much growth was experienced by entrants in a given size class. This ratio is highest for the smallest classes and above 1 for the first four. It is less than 1 for the two largest – indicating that large entrants suffer the decline common to large firms, on average.

This may be the result of the greater growth potential possessed by smaller size classes in the longer run and not specific to entrants per se. Table 8-11 indicated that smaller classes have higher rates of growth than the largest classes in the longer run. But then they also have higher exit rates. In order to examine whether the longer-run results for entrants are fundamental characteristics of the size class in which they start, the annual rate of change experienced by each size class as a result of growth and decline in continuing firms and of exits was calculated. This was applied to the initial employment size of entrants in each year to obtain their "expected" size as of 1985. This provides a measure of the expected size in 1985, if they had performed like the average of their size class in each year. The ratio of the size of entrants over the period 1978-85, as of 1985, to the "expected" size is presented in the last line of Table 8-12. A value equal to 1 indicates that the entrants' growth was characteristic of the size class. It is evident that part, but not all, of the subsequent growth of entrants is a size class phenomenon, since the ratio in the last line is lower than in the second last line for the two smallest size classes. It is about the same for the two middle size classes. It is higher for the two largest. Nevertheless, the ratio is still above 1 for the two smallest size classes. Entrants in these classes thus do have a faster growth rate than would be typical of firms in these classes; but entrants in the largest classes suffer a larger rate of decline than would be typical of their size classes (perhaps because entry here has a larger merger component).

In conclusion, the differentials, across size classes of job-growth and job-loss rates are markedly different in the short and long run. In the short run, loss rates in the small classes are very much higher than those in the largest classes. There is less difference in the long run. Whereas the implicit annual rate of gross job loss in the long run was only 8.9 per cent in the smallest class for the period 1978-86 and 3.6 per cent in the largest, the means of the annual rates over the period were 18.2 and 6.8 per cent, respectively. Since it was the annual rate of job loss that most closely reflected permanent displacements (albeit for all size classes on average), this suggests that forced job loss is very much higher in smaller firms. A subsequent section will show this is the case.

The differences between the smaller and larger size classes, when short-run rates are used, become even more marked when job-gain rates are compared. In the continuing firm sector, the mean of the annual job-gain rates was 35.6 per cent for the smallest class, but only 4.4 per cent for the largest. On both criteria then, the small size classes experience substantial volatility.

As important as these findings are for an understanding of worker displacement, they should not be used to infer that most firm change involves only small firms. It is all too easy to misinterpret any of the short-run findings. High exit rates in small firms do not mean the smaller classes disappear; nor do short-run shares of decline greater than initial shares of employment in smaller firms imply the same. High rates of entry and exit do not imply that the churning in the small-firm segment has no effect on other size classes.

The data adduced in this and the previous section that permit a comparison of short- and long-run change demonstrate that substantial intraindustry shifting is occurring in relative firm position. In the longer run, there is substantial large-firm decline, the share of exits accounted for by the middle size classes relative to the smaller ones increases, and entrants grow.

Worker Turnover by Firm Size Class at the Economy-Wide Level

Evidence presented above showed that the rates of job turnover were highest in the smallest size classes of firms. This was primarily the result of higher entry rates; but short-run job-loss rates in continuing firms and from exiting firms were also highest in the smallest size classes. Fluctuating demand for labour from firm growth and decline affects proportionately more employees in small firms.

This section examines how this variability in labour demand is translated into worker layoffs across different firm sizes. Adjustment to changing employment levels can come from displacements (layoffs) or attritions (quits, retirements, etc.). In Chapter 6, it was shown that year-to-year firm-related job loss closely approximates permanent layoffs; but this result was adduced for the manufacturing sector as a whole. There is no reason to presume that this also holds across different size categories. If it does not, adjustment in different size classes comes differentially from displacements and attritions. As discussed in Chapter 6, job loss need not equal permanent layoffs. Indeed, where attritions are high, job loss may be larger than permanent layoffs – with attritions absorbing more of the employment decline.

In light of information on the relative quality of jobs in large and small firms, it is not inconceivable that attritions are relatively higher in the latter. The OECD (1985) notes jobs in small firms pay lower wages, consist of more part-time employment, and are generally of lower quality with regards to other components of the remuneration package, such as pension coverage (see also Storey and Johnson, 1987*b*, pp. 19-21). These are the variables that have been found to increase the quit rate (Pencavel, 1970; Wales, 1970).

Data are available on the distribution of firm-initiated job loss and layoffs by size class that allow the interaction between the two to be examined. The data on job loss come from the LEAP file described in Chapter 4 and Appendix C. The data on layoffs come from the longitudinal Record of Employment file described in Chapter 6 and Appendix D.

The distribution of both layoffs (panel A) and job loss (panel B) for five firm size classes is presented in Table 8-13. Panel A contains layoffs, both permanent and temporary. The second panel presents gross job loss and its components – job loss due to exits and job loss in continuing firms. In each case the distribution of employment that is derived from each database is also included.

Both the employment and firm concepts used to create these distributions differ.[3] Nevertheless, a comparison of the size distribution of total employment derived from each source (Table 8-13, rows 1 and 5) shows a remarkable degree of similarity between the two. The separation data have a slightly higher percentage in the middle size classes, and a somewhat lower one in the largest size class.

It is evident from Table 8-13 that both total job loss and permanent layoffs follow a similar distribution. The percentage of total or gross job loss and permanent layoffs is largest in the smallest size class, decreases at first as the size class increases, and then increases in the two largest size classes. In order to make a better comparison of the two, the ratios of the percentage of total job loss and permanent layoffs in each size class relative to the overall employment distribution were both calculated. These ratios allow an evaluation of the extent to which each is disproportionately concentrated in a size class,

Table 8-13

Distribution of Firm Layoffs and Job Loss, by Size Class, Canada, 1980[1]

	Employment size class					
	1-20	21-50	51-100	101-500	More than 500	Total
			(Per cent)			
Panel A						
Employment[2]	16.2	10.3	8.5	20.2	44.9	100.0
Total layoffs[3]	21.8	13.2	11.1	22.0	31.9	100.0
Permanent layoffs	29.8	14.8	12.0	20.6	22.8	100.0
Temporary layoffs	13.7	11.5	10.2	23.5	41.1	100.0

	Employment size class					
	0-19.9	20-49.9	50-99.9	100-499.9	500 and more	Total
			(Per cent)			
Panel B						
Employment[4]	17.8	8.7	6.7	15.5	51.4	100.0
Job loss in contracting firms	34.2	13.8	9.0	15.2	27.8	100.0
Job loss due to exits	48.4	13.7	9.2	16.1	12.7	100.0
Gross job loss	37.6	13.8	9.0	15.4	24.1	100.0

1 Data in Panel A is for 1980; Panel B measures job loss by comparing 1980 with 1981, but the firm employment size distribution is for 1980. In both panels, Canadian economy-wide employment includes public administration.

2 Defined using T4s data. For details, see Chapter 6 and Appendix D.

3 Calculated using the comprehensive sample. See Chapter 6 and Appendix D.

4 Employment in the LEAP comes from average labour units. See Chapter 4 and Appendix C for details.

SOURCE Robertson (1987*b*), Tables 14 and 15, pp. 12-3; and special tabulations provided by Statistics Canada.

Table 8-14

Distribution of Job Loss and Layoffs Relative to Employment, by Size Class, Canada, 1980[1]

	Employment size class				
	1-20	21-50	51-100	101-500	More than 500
			(Ratio)		
Gross job loss/employment	2.11	1.59	1.34	0.99	0.47
Permanent layoffs/employment	1.84	1.44	1.41	1.02	0.51
Temporary layoffs/employment	0.85	1.12	1.20	1.16	0.92
Permanent layoffs/total layoffs	0.68	0.56	0.54	0.46	0.35
Exit/gross job loss	0.31	0.24	0.25	0.25	0.13

1 The first three ratios are derived from taking ratios with the distributions presented in Table 8-13; the last two are ratios involving the number of layoffs or jobs lost by firms in each size class.

SOURCE Robertson (1987*b*), Tables 14 and 15, pp. 12-3; and special tabulations provided by Statistics Canada.

relative to the employment in a size class (Table 8-14, rows 1 and 2). Both sets of ratios are greater than 1 for the smaller size classes, thereby indicating that layoffs like job loss are concentrated in smaller firms. However, permanent layoffs do not increase relative to employment in the smaller classes compared to the middle size classes as much as does gross job loss. This is suggestive of the greater role of attritions in smaller firms. The reverse holds for the largest size class. However, this conclusion must be treated as tentative because of differences in the definitions of employment and firms that are used.

The ratio of permanent layoffs to total layoffs declines for larger size classes (Table 8-14, row 4). Temporary layoffs are, therefore, a more important phenomenon relative to permanent layoffs for larger firms. However, this does not mean temporary layoffs are unduly concentrated in large firms. The ratio of temporary layoffs to employment is lowest in the smallest and the largest classes (row 3). The largest size class is not the most volatile on the basis of this criterion. The low value of the smallest size class is influenced by the higher exit rates of this class. A larger component of job loss due to exits means fewer firms can turn their employment around. But this does not explain the lower ratio in the largest size class. Part of this is probably due to the inclusion of employment in public administration in the data.[4] At most, it can therefore be concluded that, in the largest size classes, volatility arising from layoffs is not higher than might be expected on the basis of the distribution of total employment.

In summary, large and small firms differ primarily in that the latter have a relatively high percentage of permanent layoffs. But this is a reflection of a greater concentration of job loss due to firm decline. Except for the smallest size class, volatility, as measured by temporary layoffs relative to total employment, does not vary sufficiently to point to differences in relative firm performance by size class.

Conclusion

This chapter has placed the often-observed fact of high entry and exit rates in small firms in the context of firm growth and decline. By themselves, these rates say little about the dramatic changes in the intraindustry structure that are constantly taking place. Nor do they suggest the small-firm sector can be relied upon for overall net job creation. Rather, they illustrate the extent of intraindustry structural change; a process that leads to the birth of many small firms, the growth of some, the decline of large firms, and the eventual exit of those firms in permanent decline. New firms then supplant old ones. The identity of market participants and the relative size of firms change over time. During this process, there are significant temporary fluctuations in employment that are reversed in the longer run. These too lead to worker turnover.

The work in Chapter 3 that compared short- and long-run rates of entry, exit, and change in continuing firms hinted at the extent of the intraindustry structural component that is part of the adjustment to be expected in a market economy. The longitudinal study of its impact on different size classes presented here describes this process in more detail.

It is important to emphasize how different this picture of the world is than that which is often drawn. Those who focus on measures of concentration, like the four-firm concentration ratio, are effectively focusing on the outward manifestation of the end result. This is the aggregate size distribution. By not examining the instability of the underlying components, they have failed to catch the strength of the forces leading to change. At the other end of the spectrum are those who concentrate on entry and exit at a given point in time. It is all too easy to argue that since entry and exit are large in small size classes, they must have little effect on competition in the industry as a whole. Before such a conclusion can be drawn, a longitudinal study of the long-run impact of those entrants who do survive and grow is required.

Finally, there are those who focus on the fact that net job creation in the smallest size classes is positive but that in the largest size classes it is either negative or of much lesser importance (e.g., Ontario, Ministry of Industry, Trade and Technology, 1989). By doing so, they leave the impression that growth and decline elsewhere must be insignificant. This chapter has shown that this view is incorrect. For example, in manufacturing firms between 1978 and 1986, the two smallest size classes (less than 20 employees) accounted for 34 per cent of gross job gain and the two largest size classes (100 employees and more) for 42 per cent; in terms of gross job loss, the respective proportions were 11 and 69 per cent. Growth and decline is pervasive in all size classes. Furthermore, such patterns may be found when industry growth is positive, negative, or shows no trend.

While the data in this chapter provide a picture of the movement in the relative position of firms, it should not be misinterpreted. The level of industry definition used here is still relatively aggregated. Some of the firm movement will be the result of firms in one industry growing at the expense of firms in another. The next chapter, therefore, turns to a finer level of detail to examine the extent to which change is still found to be large when this is done (for some complementary work, see Baldwin and Gorecki, 1989).

9 Disaggregated Results for Job Change

In Chapter 3, the importance of the firm growth and decline process was examined mainly by using aggregate data for the manufacturing sector as a whole. Inferences were drawn about the pattern of change by comparing entry and exit rates to industry growth rates.

The observed patterns need to be investigated further. The aggregate data may hide important differences across the industries that make up the manufacturing sector. Moreover, the cross-sectional results (see Table 3-3) that found individual industry entry and exit rates responding differently to growth may not hold once other factors that affect entry and exit are taken into account.

In order to overcome possible deficiencies in the previous analysis, two approaches are employed. First, the components of job change at the two-digit industry level, based on the Standard Industrial Classification (SIC), are examined to see whether disaggregation markedly changes either the extent of turnover or its pattern. Second, the data on longer-run entry and exit between 1970 and 1979, along with multivariate regression analysis, are used to examine the chief factors that are related to entry and exit.

Rates of Job Change at the Two-Digit Industry Level

Measures of the components of job change in the manufacturing sector for the period 1970 to the early 1980s were presented in Chapter 3. There was considerably more job turnover than the change in net employment figures would suggest. Moreover, job turnover, which was the result of both inter- and intraindustry change, was considerably greater than the interindustry movements measured in Chapter 2. This suggests that intraindustry change is the prime contributor to job turnover. In this section, this hypothesis is more fully examined.

Job change at the manufacturing level is broken down into that which occurred within each of its two-digit components. For this purpose, use is made of the establishment database described in Chapter 3. The mean annual rates of job gain and job loss for 20 industries are reported in Table 9-1 for the years 1970-81. They are divided into the entry/exit and continuing establishment components used previously.

The mean annual exit rate of establishments varies from 0.4 per cent in primary metals to 3.7 per cent in clothing compared with 1.9 per cent for all manufacturing industries. The mean annual contraction rate of establishments varies from 3.7 per cent in petroleum and coal products to 8.0 per cent in clothing versus the all-manufacturing average of 6.3 per cent. While there is some variance across industries in the annual rate at which jobs are lost, it is generally of the order of magnitude given by the aggregate manufacturing sector data.

The ratio of exit to total job loss is also presented in Table 9-1 (column 8). It was used previously in Chapters 3 and 4 to measure the extent to which decline is costly. A higher proportion of job loss accounted for by exits was taken as an indication of greater adjustment costs. The average for all of manufacturing is 31 per cent. Primary metals, transportation equipment, and paper and allied products exhibit exit proportions between 9 and 20 per cent; leather, clothing, wood products, and furniture and fixtures have exit proportions in the mid-40 to low 50 percentage range.

Mean annual rates of the components and of total job gain are provided in Table 9-1 (columns 1 to 3). As already observed, they reflect not only the basic forces that lead new establishments to replace old ones but also the growth opportunities that have been present during the period. The results reveal that, even in decline, industries experience substantial gross job gain. In Chapter 2, it was shown that, at the two-digit level, tobacco, leather, textiles, knitting mills, and clothing declined in relative or absolute terms. Yet, with the exception of textiles and tobacco, all have a mean annual rate of gross job gain equal to that experienced by all of manufacturing. This confirms the importance of the growth process even in declining industries.

The ratio of the number of jobs created by entrants to gross job gain is presented in column 4. Since the estab-

Table 9-1

Year-to-Year Rates of Establishment Job Gain and Loss[1] in Manufacturing Industries at the Two-Digit Level, Average of Yearly Data, Canada, 1970-81

	Job gain due to:				Job loss due to:			
	Entry (1)	Expansion in continuing growing establishments (2)	Gross or total job gain (3)	Entry/ gross job gain (4)	Exit (5)	Contraction in continuing declining establishments (6)	Gross or total job loss (7)	Exit/ gross job loss (8)
		(Per cent)		(Ratio)		(Per cent)		(Ratio)
Food and beverages	0.96	7.16	8.13	13.7	1.86	5.96	7.82	31.9
Tobacco products	0.41	3.58	3.84	13.3	1.61	4.47	5.64	38.8
Rubber and plastic products	2.09	8.18	10.27	26.3	1.22	6.11	7.33	23.0
Leather	1.46	8.04	9.51	22.0	2.69	6.96	9.65	44.1
Textiles	1.22	6.43	7.66	20.8	1.93	6.47	8.41	32.5
Knitting mills	1.46	7.67	9.14	19.0	2.64	7.81	10.45	35.9
Clothing	2.68	8.59	11.28	31.2	3.70	7.96	11.67	47.4
Wood products	2.60	10.19	12.79	27.6	2.86	7.68	10.54	44.2
Furniture and fixtures	2.13	8.75	10.87	24.9	3.27	6.55	9.81	51.5
Paper and allied products	0.70	4.44	5.10	16.3	0.56	3.89	4.44	15.3
Printing and publishing	1.81	6.68	8.48	27.2	2.02	4.96	6.98	41.5
Primary metals	0.74	5.36	6.11	14.3	0.43	4.97	5.40	8.9
Metal fabricating	1.81	8.67	10.48	21.4	1.99	7.08	9.08	29.6
Machinery	1.71	9.38	11.10	19.8	2.01	7.62	9.63	30.7
Transportation equipment	1.45	8.95	10.40	16.3	1.26	7.48	8.73	20.3
Electrical products	1.71	8.17	9.88	21.5	1.57	7.75	9.33	25.0
Nonmetallic mineral products	2.03	7.63	9.66	27.0	1.66	6.92	8.58	26.1
Petroleum and coal products	1.45	5.72	7.04	32.2	0.70	3.69	4.38	20.8
Chemical and chemical products	1.42	6.37	7.78	22.6	1.11	5.31	6.42	22.2
Miscellaneous manufacturing	2.14	8.45	10.60	26.7	2.71	7.21	9.92	39.5
Mean[2]	1.62	7.42	9.00	22.3	1.89	6.34	8.21	31.4

1 Based on employment change at the establishment level.

2 Mean across all annual two-digit industry observations.

SOURCE Special tabulations provided by Statistics Canada.

lishment database is being used, entrants are new establishments created by new firms and by existing firms. The ratio does not reveal how important new firms are, but rather how important new production units are. The average ratio of entry to total job growth across all industries for the period is 22.3 per cent. This varies from a low of less than 14 per cent in food and beverages and tobacco to a high of above 30 per cent in petroleum and coal products and clothing.

It was demonstrated in Chapter 3 that entry was more volatile than exit – at least for new firm establishment creation and exiting firm establishment closure. The reverse was true for continuing firms. The data used here combines new and exiting establishments from all these groups of firms. Nevertheless, since firm birth and death dominate the establishment creation and destruction process, overall establishment entry might be expected to be more volatile. This was confirmed. The standard error of the mean job-gain rate due to new establishments was larger in 14 of the 20 industries than that of the mean job-loss rate due to establishment closures. The differences were generally significant at the 5-per-cent level.

Chapter 3 examined not only rates of job growth and decline but also the average size of adjustment – the average change in employment for growing as opposed to declining establishments. Table 9-2 provides the average size (in terms of wage and salary earners) of all establishments at the two-digit level – those growing, those declining, those entering, and those exiting. In addition, the average employment decline and growth in continuing establishments is also presented. In Chapter 3, the average size of exits and entrants was found to be greater than the average change in employment in the continuing segment. The average size of a declining establishment was found to be greater than that of a growing establishment. Both entrants and exits were found to be small relative to the average size of an establishment. These patterns are also found generally at the two-digit level, particularly for the difference between entrants/exits and the mean size of an establishment.

Tables 9-1 and 9-2 measure the components of job gain and loss on an annual basis. As such, they depict the amount of short-run change. In order to examine long-run change at the two-digit level, use is made of the establishment entry and exit share data obtained from a comparison of establishment status in 1970 and 1979.

In Table 9-3, the 1979 employment share for establishments newly created since 1970 and the 1970 employment share for establishments that closed by 1979 are presented for 20 two-digit manufacturing industries. In the decade covered by this table, the mean job-loss rate from establishment exits was 20 per cent. The lowest rate occurred in primary metals (6 per cent); the highest, in clothing (43 per cent). The mean job-gain rate from establishment openings was 18 per cent. The lowest rate occurred in tobacco (4 per cent); the highest rates, in rubber and plastics, clothing, and machinery (26 to 28 per cent).

Disaggregated data at the two-digit level confirm the importance of long-run change derived from data for the manufacturing sector as a whole presented in Chapter 3. Job gain and job loss at the manufacturing level are not the result of job loss being concentrated in some indus-

Table 9-2

Annual Employment Changes Associated with Job Change in Manufacturing Industries at the Two-Digit Level, Average of Yearly Data, Canada, 1970-81

	Average size of all establishments	Growing establishments		Declining establishments		Average size of entrants	Average size of exits
		Average size	Average increase	Average size	Average decline		
	(Number of wage and salary earners)						
Food and beverages	65.1	74.4	11.6	81.6	10.7	20.6	26.1
Tobacco products	303.0	387.0	29.9	368.3	31.1	28.6	70.3
Rubber and plastic products	83.8	83.1	13.3	108.2	15.0	22.4	24.7
Leather	78.2	78.6	13.8	90.8	13.2	28.2	44.9
Textiles	93.1	101.0	14.4	117.6	15.4	28.0	35.8
Knitting mills	87.7	86.4	15.3	103.4	16.5	36.7	44.9
Clothing	56.4	59.4	12.1	68.1	11.4	25.5	32.4
Wood products	56.1	58.9	12.5	67.3	11.4	25.1	27.4
Furniture and fixtures	44.0	47.9	9.1	52.1	8.2	20.0	24.7
Paper and allied products	198.3	212.1	18.0	220.3	18.9	47.4	46.2
Printing and publishing	39.9	46.4	6.6	52.1	6.3	13.1	17.0
Primary metals	349.7	371.0	37.4	402.3	45.0	109.4	53.1
Metal fabricating	51.9	51.6	9.7	66.3	10.2	19.6	28.0
Machinery	100.3	95.7	18.1	122.5	20.2	33.2	55.6
Transportation equipment	210.6	228.3	40.0	255.4	40.6	52.6	45.0
Electrical products	168.6	154.6	27.7	214.3	32.7	51.5	69.9
Nonmetallic mineral products	51.3	55.2	9.2	63.8	9.3	18.3	19.4
Petroleum and coal products	112.4	134.5	14.2	131.7	11.5	36.9	26.4
Chemical and chemical products	80.2	90.7	11.5	99.0	12.2	28.3	26.7
Miscellaneous manufacturing	34.8	43.0	8.0	49.6	7.9	16.6	14.7
Mean[1]	113.3	122.9	16.6	136.8	17.4	33.2	36.2

[1] Mean across all annual two-digit industry observations.

SOURCE Special tabulations provided by Statistics Canada.

Table 9-3

Long-Run Establishment Entry and Exit Employment Shares in Manufacturing Industries at the Two-Digit Level, Canada, 1970 and 1979[1]

	Share of:	
	1979 employment in establishments created since 1970	1970 employment in establishments closed by 1979
	(Per cent)	
Food and beverages	10.5	19.0
Tobacco products	3.8	24.2
Rubber and plastic products	26.5	14.2
Leather	15.1	29.3
Textiles	18.7	25.4
Knitting mills	15.2	27.8
Clothing	26.8	42.6
Wood products	24.4	25.1
Furniture and fixtures	25.9	32.7
Paper and allied products	9.0	6.6
Printing and publishing	17.6	20.7
Primary metals	6.4	5.5
Metal fabricating	24.1	27.7
Machinery	27.8	21.0
Transportation equipment	16.4	10.8
Electrical products	21.1	24.2
Nonmetallic mineral products	16.7	16.9
Petroleum and coal products	16.4	9.1
Chemical and chemical products	15.4	16.7
Miscellaneous manufacturing	18.6	23.1
Mean[2]	17.7	19.7

1 The sample consists of all 167 four-digit manufacturing industries.
2 Mean across all 167 four-digit industry observations.
SOURCE Special tabulations provided by Statistics Canada.

tries and gain in other sectors. Each of the two-digit industries examined here is characterized by substantial intraindustry change.

The Relative Contribution of Entry and Exit to Change in Employment

Data on the magnitude of job change in individual manufacturing industries confirm the earlier impressions of the ubiquity of change. Previous chapters also examined whether the same patterns of job change could be found in different countries and from different data sources. In particular, the extent to which entry and exit rates exhibited different volatility over time was carefully examined. Aggregate time-series data for the Canadian manufacturing sector indicated that entry was more variable than exit. Both time-series and cross-sectional data from other countries, like the United States, possess similar differences. As has been stressed, this has important implications for our understanding of the adjustment process. Adjustment to change comes not just from changes in exits but also from changes in entry. The critical question of how much comes from each side and what conditions affect the proportion that comes from increased exits bears further investigation.

This issue was investigated further with the establishment-based data on annual job change due to entry and exit, developed in Chapter 3, disaggregated to the two-digit industry level. Because, in the long run, job change is dominated by entry and exit, it was these components that were chosen for the analysis.

Net employment growth (*NG*) is related to entry (*E*) and exit (*X*) by the equation:

$$NG_t = E_t - X_t . \qquad (9.1)$$

Therefore, the change in employment growth between period *t* and *t* – 1 is equal to:

$$NG_t - NG_{t-1} = \left(E_t - E_{t-1}\right) - \left(X_t - X_{t-1}\right). \qquad (9.2)$$

Net employment growth may increase because either entry increases ($E_t - E_{t-1}$ is positive) or exit decreases ($X_t - X_{t-1}$ is negative). Employment growth may decline either because entry decreases or exit increases. How much of the change in net growth is accounted for by entry change as opposed to exit change will determine whether adjustment occurs primarily on the entry or the exit side.

The first variable used to measure this is:

$$R = -\frac{X_t - X_{t-1}}{NG_t - NG_{t-1}}, \qquad (9.3)$$

where *R* represents the proportion of the change in net employment growth that results from a change in exits.

Since it is important to know how exit adjusts to positive, as opposed to negative, changes in employment growth, two variants are utilized. These are:

$$R1 = R, \tag{9.4}$$

when $NG_t - NG_{t-1} > 0$, and

$$R2 = R, \tag{9.5}$$

when $NG_t - NG_{t-1} < 0$.

$R1$ represents the contribution exit change makes when changes in net employment growth are positive; $R2$ is the contribution exit change makes when changes in net employment growth are negative. The latter may not, however, capture the aspect of adjustment that is of greatest interest. The *change* in net employment growth may be negative but net employment growth may still be positive. Therefore, the proportion of change accounted for by exit change, when the change in net growth rate and net growth are both negative in period t, $R3$, is also used. It is defined as follows:

$$R3 = R, \tag{9.6}$$

when $NG_t - NG_{t-1} < 0$ and $NG_t < 0$.

These rates were calculated annually for all two-digit manufacturing industries for the period 1970-81. The means across all years and all industries are reported in Table 9-4. On average, across all industries, exit change accounted for less than half (47 per cent) of the change in net employment growth from exits and entry. It accounts, on average, for 38 per cent when the change in net employment is positive ($R1$) and 54 per cent when the change in net employment is negative ($R2$). When negative changes in net growth were also accompanied by a decline in employment, the percentage accounted for by exit change increases to 67 per cent ($R3$). The means of both $R2$ and $R3$ are significantly greater than $R1$.

Thus, exits contribute less than half of the adjustment when economic conditions are improving; somewhat more than half when they are declining. The latter is similar to the result derived in Chapter 4 from an examination of the data from the LEAP file for the recession years 1981-82. But when the growth rate is declining and employment is falling, exit change accounts for 67 per cent of the net change in employment.

Earlier it was established that industries varied considerably in terms of their exit rates. Weak evidence was also presented, using LEAP file data, that the amount of adjustment that comes from exits is inversely related to exit rates. Where exit rates are normally high (because of the competitive character of an industry), they respond less to changes in overall economic circumstances. High normal rates mean employment decline is less likely to require additional displacements from exit and contraction. Adjustment occurs primarily through lower rates of entry.

Table 9-4

Contribution of Annual Changes in Establishment Exits to Changes in Net Employment Change from Establishment Entry and Exit in the Manufacturing Sector, Two-Digit Level, Canada, 1970-81[1]

	R	$R1$	$R2$	$R3$
		(Per cent)		
Mean	47	38	54	67
Standard error of mean	24	38	32	40
		(Number)		
Number of observations	200	84	116	89

[1] For a definition of R and $R1$ to $R3$, see text. The means were calculated from two-digit annual data for the period 1970-81.

SOURCE Special tabulations provided by Statistics Canada.

This relationship was tested using the two-digit data for manufacturing. The mean values of R for 20 two-digit industries were regressed on the average industry exit rates. The coefficient was negative and significant at the 10-per-cent level. Once more, there is weak evidence to suggest that, in industries with higher turnover, there is less adjustment on the exit side.

Turnover and Import Competition

Discerning whether there is a pattern to job turnover is as important as providing measures of the size of the adjustment constantly taking place. In what follows, the extent to which turnover is related to measurable industry characteristics is investigated. In earlier sections, the relationship between entry, exit, and growth was examined (see Table 3-3). This section focuses on a second factor that may influence the amount of adjustment taking place in an industry – its openness to trade.

Adjustment problems are most commonly discussed in the context of import-competing industries. Two issues are germane to these discussions. The first is the extent to which import competition has forced unduly high exit rates on these industries. The second is the extent to which the job-turnover rates found in these industries are particularly low and, therefore, suggest that the normal or typical margin available for adaptation is less in these industries.

These questions were examined in two steps. First, manufacturing industries were divided into those that had high or low import-penetration ratios – defined as the 1970 ratio of imports to domestic sales. The mean decadal (1970-79) exit rates, in terms of the number of establishments and shares of employment, were calculated at the four-digit SIC level for each group of industries (Table 9-5). The differences in these rates for the two sets were relatively minor. The means of the separation-rate data were also calculated for the major group (two-digit) of manufacturing industries. The overall separation rate for the two groups was very similar. On the basis of this evidence there is little to distinguish import-competing manufacturing industries from the rest.

We also examined four specific major group industries that are widely regarded as trade-sensitive (Economic Council of Canada, 1988*b*). These are leather, textiles, knitting mills, and clothing. In the first case, the means of the annual establishment exit and decline rates were calculated, as well as several other characteristics (Table 9-6). The exit and decline rates are slightly higher for these industries than for the manufacturing sector generally, but so too are the entry plus growth rates. Moreover, the minimum exit plus the minimum decline rate, a proxy suggested by the OECD (1987, p. 107), for the amount of turnover that is of a structural nature is also generally higher in these industries. These industries are characterized by more, not less, intraindustry dynamism than the rest of the economy.

Finally, separation rates for these trade-sensitive industries for 1975-79, a period of sustained growth, were examined (Table 9-7). The total separation rate for each of the trade-sensitive industries is not significantly different from that for the economy or the manufacturing sector as a whole. The permanent-layoff rate is a little lower and the quit rate a little higher than for the economy as a whole. Adjustment in these industries may be able to rely more on the "voluntary" attrition component of separations than elsewhere.

Table 9-5

Comparison of Establishment-Exit and Labour-Turnover Rates in Manufacturing Industries with High and Low Import Penetration, Canada, 1970s and Early 1980s

	Average for industries with import penetration[1]	
	Below the median	Above the median
	(Per cent)	
Exit rates,[2] 1970-79:		
Proportion of exiting establishments of:		
Exiting firms	29.3	28.4
Continuing firms	17.2	18.8
Proportion of employees in exiting establishments of:		
Exiting firms	4.2	4.4
Continuing firms	4.4	4.9
Separation rates,[3] 1975-83:		
Displacements (or layoffs)		
Temporary	11.2	12.9
Permanent	13.0	10.0
Attritions		
Quits	9.5	9.4
Other[4]	13.1	15.5
All separations	46.8	47.8

1 Import penetration is measured by the ratio of imports to domestic consumption.

2 Exiting firms (or establishments) are those which existed in 1970 but not in 1979. Continuing firms (and establishments) existed in both 1970 and 1979. The percentages are expressed on the 1970 base. The exit data are based on a classification that divides the manufacturing sector into 167 industries at the four-digit level.

3 Separations are expressed as a percentage of total employment. The data presented here are calculated as averages for the period 1975-83, excluding 1980. The separations data are based on the two-digit industry classification, but knitting and clothing were combined.

4 Defined as all separations except layoffs and quits.

SOURCE Special tabulations provided by Statistics Canada; and Robertson (1987*a*), Tables A-4 to A-12, n.p., and additional data provided by the author.

Multivariate Analysis of Exit and Entry Rates

Until now, examination of the patterns of job change has been limited to two-dimensional comparisons. Entry and exit rates have been compared to one another over time, or they have been cross-classified on the basis of a single industry characteristic such as industry growth or the levels of import competition in an industry. The problem with such an analysis is well known. It may incorrectly measure the strength of a relationship because it fails to account for other significant factors that influence exit and entry. In this section, the previous analysis is extended by using multivariate regression analysis to sort out the relationship between entry and exit and a number of factors that have been previously found to affect both.

In earlier papers, Baldwin and Gorecki (1983, 1987) focused on the number of firms that entered and exited an industry between 1970 and 1979. Since the focus in this study is on the resource impact of entry and exit, they are measured here, not in terms of the number of firms, but in terms of the amount of employment created or lost relative to total employment. Establishment entry and exit is divided into two groups: that arising from new firms or exiting firms and that arising from continuing firm activity.

The data used for the investigation come from the database developed to examine long-run entry and exit (see Baldwin and Gorecki, 1983). Establishments that existed in a four-digit industry in 1979 but not in 1970 were classified as new (births). Establishments that existed in 1970 but not in 1979 were classified as closures (deaths).[1] Because establishments are linked to firm codes, it is possible to aggregate commonly controlled establishments at the four-digit SIC industry level to produce "unconsolidated" firms and to classify the latter as new, as exits, or as continuing in a given industry. New firms are those that possessed establishments in a particular four-digit industry in 1979 but not in 1970; exiting firms are those that possessed establishments in 1970 but not in 1979. Continuing firms possessed establishments at both the beginning (1970) and the end (1979) of the period. The entering-firm category was

Table 9-6

Characteristics of Exiting and Declining Establishments in Four Trade-Sensitive Manufacturing Industries, Canada, 1970-81

	Leather	Textiles	Knitting mills	Clothing	All manufacturing[1]
			(Per cent)[2]		
Characteristics:					
Exit rate	2.8 (0.3)	2.0 (0.3)	2.8 (0.3)	3.7 (0.4)	1.9 (0.1)
Contraction rate of continuing establishments that decline	7.1 (0.9)	6.7 (0.7)	7.8 (0.8)	7.9 (0.6)	6.4 (0.2)
Exit/contraction rate	0.46 (0.09)	0.32 (0.05)	0.38 (0.05)	0.47 (0.04)	0.31 (0.01)
Minimum exit plus decline rate	6.8	4.5	6.5	8.2	5.6
Entry rate plus growth rate of continuing establishments that grow	9.1 (0.5)	7.5 (0.5)	9.0 (0.8)	10.9 (0.7)	8.7 (0.2)
			(Number of persons)[3]		
Average employment in exiting establishments	45.6 (5.6)	36.6 (3.6)	46.6 (4.1)	32.6 (2.2)	36.4 (2.1)
Average reduction in employment in declining establishments	13.2 (1.1)	15.7 (1.2)	16.6 (1.3)	11.3 (0.6)	17.2 (0.9)
Average employment in all establishments	78.5 (0.8)	93.4 (1.3)	88.3 (1.1)	56.3 (0.7)	112.7 (6.1)

1 For each characteristic, the table refers to the mean of the characteristic across all annual two-digit industry observations.
2 Percentage of total employment. Standard error of mean in parentheses.
3 Defined as wage and salary earners.
SOURCE Special tabulations provided by Statistics Canada.

Table 9-7

Separation Rates[1] in Selected Trade-Sensitive Manufacturing Industries, Canada, 1975-79

	Displacements[2]	Attritions		All separations
		Quits	Other[3]	
	(Per cent)			
Leather	11.2	12.1	12.7	46.9
Textiles	9.9	12.1	12.2	44.7
Knitting mills and clothing	10.3	10.8	13.7	43.8
All manufacturing industries[4]				
Mean	10.3	11.2	13.3	44.1
Standard error of mean	0.9	0.6	1.4	3.5
All industries[5]				
Mean	12.4	11.2	13.0	45.4
Standard error of mean	1.9	0.6	1.0	4.0

[1] Calculated as a percentage of employment. For a definition of employment, see Chapter 6 and Appendix D. The table presents for each industry the mean rate across the years 1975-79.
[2] Permanent layoffs.
[3] Defined as all separations except layoffs and quits.
[4] Divided into 19 industries. See Table 2-2 for details.
[5] Divided into 29 industries. See Table 6-6 for details.
SOURCE Robertson (1987*a*), Tables A-4 to A-8, n.p., and additional data provided by the author.

further divided into those firms that came into existence via establishment creation and those that did so by purchasing an establishment. Exiting firms were divided into those that did so by closing an establishment and those that did so by divesting themselves of an establishment. For this study, interest centres on two groups: new firms that arose from establishment creation (category 23) and exiting firms that did so by closing their establishments (category 34); and establishments opened by continuing firms (category 13) and establishments closed by continuing firms (category 14).

The dependent variables are defined as:

*SH*23 – the employment (measured as of 1979) in new establishments belonging to new firms divided by total 1979 industry employment;

*SH*13 – the employment (measured as of 1979) in new establishments belonging to continuing firms divided by total 1979 industry employment;

*SH*34 – the employment (measured as of 1970) in closed establishments belonging to exiting firms divided by total 1970 industry employment; and

*SH*14 – the employment (measured as of 1970) in closed establishments belonging to continuing firms divided by total 1970 industry employment.

In earlier work (Baldwin and Gorecki, 1983, 1987), the effect of a large number of regressors was examined. They fell basically into one of four groups: 1) growth; 2) profitability; 3) barriers to entry; and 4) miscellaneous factors other than standard barrier variables that described the openness of markets (such as trade penetration). A subset was chosen of the variables that were found previously to have had the strongest explanatory power. The variables used in the regression and their definitions are presented below.

GROW = The rate of industry growth defined by the regression of the logarithm of the real value of shipments on time for the period 1970-79.

VAR = The variability of industry demand, defined as the standard deviation of the real value of shipments around the logarithmic regression of shipments on time for the period 1970-79.

PROFIT = A measure of industry profitability for the year 1970 that combines overall profitability along with a measure of how well small firms do relative to large firms. It is defined as – (1 – *PCON*) × (*PDIFF*). It varies inversely with the difference between large- and small-firm profitability and directly with overall profitability. The terms in *PROFIT* are defined as follows: *PCON* is the weighted gross rate of return (P/K) in 1970 of all firms that continued in the industry throughout the decade; *P*/*K* is the gross rate of return defined as total activity value added less wages and salaries divided by industry gross capital stock for 1970; and *PDIF* is the difference between the gross rate of return (*P*/*K*) of the top half of the industry, ranked on the basis of size, and the gross rate of return of the bottom half, as of 1970.

CONC = A measure of the degree to which a small number of firms control industry output. It is measured as the proportion of industry shipments accounted for by the four leading firms in 1970.

FOR = A measure of the importance of foreign ownership, defined as the proportion of industry sales accounted for by foreign-controlled firms as of 1970.

CA = A measure of the comparative advantage of the industry, defined as exports minus imports divided by the sum of exports plus imports plus one, as of 1971.

The first variable (*GROW*) is the rate of growth in industry shipments. It is expected to have a positive coefficient for entrants and a negative one for exits. The second variable (*VAR*) measures the variability in sales around the trend growth rate (*GROW*). Its sign, a priori, is indeterminate. An industry with a high value of *VAR* offers greater short-run temporary opportunities for new firms when sales increase above the long-run trend, but also a greater decline when sales fall below the trend. It is possible that both entry and exit will, therefore, be positively related to this variable. On the other hand, if these fluctuations make the industry riskier, this may lead to less, not more, entry. The response, of course, will depend upon the extent to which the production process is flexible enough to permit existing producers to meet fluctuations in demand.

The third variable (*PROFIT*) measures the profitability incentives for entry and exit. It is an interaction term that measures both continuing-firm profitability and the difference in profitability of large and small firms (since entering firms are generally smaller). *PROFIT* is lower if continuing-firm profitability is lower or there is a greater gap between large- and small-firm profitability. Its expected sign is positive for entry and negative for exits.

The profitability variable is measured as of 1970. Since the entry and exit shares are calculated for the decade 1970-79, it may not capture changes in profitability that occur over a decade. Therefore, alternate formulations of the *PROFIT* variable were tried. One was the average of this variable for 1970, 1975, and 1979. Another was the rate of growth of profitability over the decade. These variables were all highly related and in the end the definition used herein was selected because it yielded the equation with the most significance. This suggests, as recent literature has begun to explore, that profits can persist (Mueller, 1986).

The fourth variable (*CONC*) is used to capture the effects of barriers to entry. It is measured as the four-firm concentration ratio. In previous work that used the number of entrants and exits, it was found that proxies for entry barriers reduced both entry and exit. Therefore, its sign is expected to be negative in both cases.

The fifth variable (*FOR*) measures the importance of foreign ownership. Previous studies (Gorecki, 1976; Baldwin and Gorecki, 1983, 1987) show that foreign and domestic entrants or exits respond quite differently to entry barriers and profitability variables.

The sixth variable (*CA*) captures the extent to which exports are large relative to imports. This variable is larger for industries that are more "competitive" using this criterion. It will have a negative coefficient if the openness of an industry (as measured by this variable) reduces the extent to which both entry and exit respond to the other variables included in the regression.

The regression results are reported in Table 9-8 as well as the significance level for a two-tailed *t*-test, which would just allow rejection of the null hypothesis that the coefficient is zero. The sample chosen for the analysis consisted of 167 four-digit manufacturing industries less some 26 industries that were classified as miscellaneous. Since the dependent variable is bounded by zero and one, a logistic transformation of the share equation[2] was performed and an ordinary-least-square technique was used.[3]

The aggregate data for the manufacturing sector used in Chapter 3 showed a considerable difference in the behaviour of the aggregate employment time series associated with new firm and with continuing firm establishment creation.[4] The former was more variable than the latter over time. A similar though smaller difference was also found for the employment associated with establishment closure rates of exiting and closing firms. The cross-sectional regression analysis confirms these differences. The regression equations for the continuing firm establishment creation (*SH*13) and closure (*SH*14) are not significant at the levels conventionally chosen; those for new firm establishment creation (*SH*23) and exiting firm establishment closure (*SH*34) are significant.

The regression results show that higher growth rates lead to more entry and less exit; higher variability (*VAR*) leads to more entry and more exit. The earlier findings that entry responds more to economic fluctuations than does exit is substantiated. In the new firm (*SH*23) and exiting firm (*SH*34) equations, the growth (*GROW*) vari-

Table 9-8

Regression Results for Establishment Entry and Exit Employment Shares across 141 Manufacturing Industries, Using a Logistic Transformation, Canada, 1970-79[1]

	Dependent variables: employment shares for establishments			
	Created by firms		Closed by firms	
	New (*SH*23)	Continuing (*SH*13)	Exiting (*SH*34)	Continuing (*SH*14)
Regressor:				
GROW	0.1168 (0.0325) [0.0005]	–0.0422 (0.0359) [0.2432]	–0.0307 (0.0274) [0.2660]	–0.0604 (0.0522) [0.2503]
VAR	0.0112 (0.0022) [0.0001]	0.0006 (0.0027) [0.8205]	0.0071 (0.0019) [0.0004]	0.0021 (0.0038) [0.5830]
PROFIT	0.9114 (0.7373) [0.2189]	0.4960 (0.7386) [0.5035]	0.8567 (0.6297) [0.1753]	0.6573 (2.3076) [0.7764]
CONC	–0.0169 (0.0053) [0.0018]	0.0023 (0.0055) [0.6823]	–0.0248 (0.0046) [0.0001]	0.0033 (0.0074) [0.6540]
FOR	–1.0366 (0.3941) [0.0097]	0.7655 (0.4257) [0.0754]	–0.8976 (0.3320) [0.0079]	1.0818 (0.5716) [0.0616]
CA	–0.3702 (0.1675) [0.0291]	0.2350 (0.1784) [0.1912]	–0.4072 (0.1448) [0.0057]	–0.0742 (0.2531) [0.7699]
$\bar{R}^2$	0.3731	0.0809	0.4458	0.0724
F	11.604	1.350	16.089	1.158
d.f.	6,117	6,92	6,120	6,89
Prob F	0.0001	0.2435	0.0001	0.3358

[1] For a definition of variables, see text. The standard error of the estimator is in parentheses. The probability that $|t| > 0$ is in square brackets. Individual regressions exclude industries where the dependent variable is zero.

SOURCE Special tabulations provided by Statistics Canada.

able is significant at the 1 per cent level for entry but not for exit. While variability (*VAR*) is significant in both equations, its coefficient is larger for entry.

The coefficient on concentration (*CONC*) is significantly negative for both *SH*23 and *SH*34. There is less entry and exit in concentrated industries. Earlier in the study, it was established that entry and exit are related. High rates of entry should also lead to high rates of exit, if only because new firms fail at high rates. The negative coefficient on the concentration variable then confirms that in industries where structural characteristics are such as to lead to less entry, there is also less exit.

Profitability is not significant in either the *SH*23 or *SH*34 equations. On the other hand, greater exports and less imports (*CA*) are associated with significantly less entry (*SH*23) and exit (*SH*34). Foreign ownership in an industry is associated with less entry and less exit and is significant at the 1 per cent level.

An attempt was made to determine whether concentration and foreign ownership interacted with the growth, variability, profitability, or comparative advantage variables. This was achieved with binary variables that separated the industries into those above and below the median value of the concentration and the foreign ownership variable. The values of the concentration and the foreign ownership variable were also used in a multiplicative form with these variables. The only robust finding resulting from this exercise was that foreign ownership decreases the effect of the variability variable (*VAR*) on both new firm establishment creation and exiting firm establishment closure. Multinationals thus do not respond to short-run fluctuations as do domestic firms. This accords with the findings of others that multinationals possess somewhat greater inertia – but it indicates that it is in response to short-run fluctuations and not long-run trends where the primary difference lies (Economic Council of Canada, 1988*b*, pp. 40-1).

Finally, a significant test was performed to see whether the coefficients on the firm entry (*SH*23) and exit process (*SH*34) differed significantly. This was done by pooling the two entry and exit data sets.[5] The growth variable was significantly lower for exits than entrants at a 5-per-cent level of significance. There was also a similar difference in the variability (*VAR*) coefficient though it was only significant at the 15-per-cent level. These results confirm that entry responds more than exit to changes in economic conditions – after correcting for the other determinants of the entry and exit process. New firm establishment openings are also increased significantly more by long-term growth trends than are exiting firm establishment closures.

In conclusion, much of the analysis presented in previous chapters was based on aggregate data. When aggregate data are used, caution must always be exercised when drawing conclusions. In this chapter, it has been shown that the most important conclusions that were drawn earlier still hold at a finer level of aggregation. Change within industries from firm growth and decline is large. Entry and exit respond differently to basic economic forces. Exit is much less affected by basic long-term trends. Adjustment occurs, therefore, on both the entry and exit side but more so from changing entry rates than from changing exit rates.

10 Conclusion

This study provides quantitative measures of the amount of change that the Canadian economy absorbed as it was subjected to a variety of shocks in the era since 1970. Three separate questions are posed. Are intersectoral shifts in the relative size of industries an important source of reallocation? To what extent are jobs reallocated among firms as producers grow and decline? How does job change at the industry and firm level translate into worker movements?

One view of change, perhaps the most prevalent, is that reallocation is primarily an interindustry phenomenon. The dramatic long-run movement of labour out of agriculture has undoubtedly influenced the importance that has been given to studies of interindustry change. In addition, the tendency of industrial economists to measure market structure by focusing on firm-size distributions, rather than movement within these distributions, has conditioned the way in which change is viewed. Because most studies of concentration have found the overall firm-size distribution to be relatively stable, there have been very few studies, as a result, that have examined intraindustry change. While economists such as Nelson and Winter, Prais, Simon, and Steindl have developed theoretical models with considerable intraindustry movement in relative firm sizes that produce firm-size distributions very similar to those actually observed, their work has not had a widespread impact upon the importance attributed to intraindustry changes.

There are some empirical studies that suggest the dimensions of change within industries are far larger than usually appreciated. They too have had little effect for a number of reasons. The U.S. Department of Commerce studies done by Churchill provided measures of firm entry that do not differ significantly from the Canadian rates reported herein. But they failed to receive much attention for two reasons. First, they measured impact in terms of the number of businesses rather than employment. Second, they found that most entering firms died quickly and, by not measuring the importance of entrants over a longer period, they left the impression that entry had no lasting effect.

Studies of job change have had more of an influence though, here too, certain deficiencies have attenuated the importance of their findings. First, the data have had to be generated from private sources both in the United States and the United Kingdom. Debates about the accuracy of the data have detracted from many of the findings of these studies (see Storey and Johnson, 1986; Johnson and Storey, 1985). Second, the data have not always been in a form that would allow critical distinctions to be made. In particular, the difference between employment growth due to entrants and that due to continuing firm expansion has not been measured with a great deal of accuracy. Entry in many studies contains a merger component and is, therefore, not really job creation. This problem originates in the use of a data source that was not originally collected with the object of performing accurate job-change studies. Third, most of the studies have not distinguished between short- and long-run changes. As a result, they do not separate transitory from structural change. If much of the short-run or year-to-year employment change in continuing firms is reversed in the long run, job-change studies based on short-run data overestimate structural change. If most entrants die or subsequently stagnate, short-run entry rates will not capture the importance of entry in the longer run. Finally, the greatest problem with job-change studies is that they have failed to link firm employment change to worker separations. As such, they left a critical question unanswered, since they could not be used to infer the effect of job change on the reallocation of workers. These deficiencies have meant that readers have been unable to determine whether the job turnover being reported contained a large transitory element and, therefore, whether it had only a marginal relationship to the amount of labour being reallocated.

While job-change studies are of more recent vintage, separation data showing a considerable annual turnover in workers have been available for some time. Yet, they too have had only a limited effect upon how change is viewed. In some cases, the detail necessary to distinguish the separations that occurred because of a voluntary return to school or retirement as opposed to a forced layoff was unavailable. As such, it was difficult to evaluate whether the separations being discussed were directly related to fluctuations in firm fortunes or whether they arose because of personal reasons like sickness or pregnancy. While a certain component of the nonlayoff category will be indirectly related to the same factors that produce layoffs, it is, nevertheless, the case that a portion is not, and this component is often regarded differently by those considering the size of separations brought about by structural change. In addition, even when data on layoffs per se were available, they were rarely divided between those who were only temporarily separated from their employer and those who moved to other employers. Feldstein's (1975) attempt to do so garnered interest because of its focus on how much of the total was temporary, rather than on how much was permanent. Partially for this reason, separation data have not been widely used to infer the amount of reallocation that was taking place in labour markets.

This study set out not only to quantify the amount of labour reallocation constantly taking place but also to do so in such a way as to overcome many of the deficiencies in the literature. Because of the interest traditionally given to interindustry reallocation, the study commenced by investigating the amount of change in this area. Changes in relative industry employment shares were examined with the aid of a dissimilarity index. While the amount of cumulative change over long periods in the relative importance of different industries has sometimes been quite large, the annual rates of change yielded by this index have not been. At the two-digit manufacturing level, less than 1.5 percentage point of total employment shifted annually to those industries that were increasing their share when industries were compared year-by-year in the 1970s; less than 0.4 percentage point per year when only cumulative change between 1972 and 1981 was considered. While the value of the change indices varied depending upon the years chosen and the level of aggregation employed, the amount of labour reallocation that occurred as a result of interindustry shifts in relative importance was small in comparison to the measures derived from job-change and worker-turnover statistics.

The second major focus of this study was on the amount of job change that takes place. Many of the shortcomings of the earlier job-change investigations have been overcome. In order to provide comprehensive coverage, data from the Canadian Census of Manufactures were employed. In order to draw critical distinctions that have been missing previously, care was given to the measurement of different aspects of change. To this end, job change was measured using both establishment and firm data. Establishment data measure establishment creation by both new firms and continuing firms; exits include closed establishments of exiting firms and continuing firms. Job change derived from these statistics avoids in large measure the problem that has previously existed when mergers have been treated as births and deaths. In addition, this study used firm data to examine the importance of entry by firms that create new establishments, as opposed to entry by merger or acquisition of an establishment. Finally, different time periods were employed in order to investigate whether the absolute size and relative importance of the various components of job change varied in the short run as opposed to the long run.

When establishments between adjacent years are compared, job turnover was found to be substantial. For the manufacturing sector as a whole, jobs lost in declining establishments accounted for about 6.5 per cent of total employment annually between 1970 and 1981 and jobs lost in exiting establishments for about 1.9 per cent. On the other hand, growing establishments increased employment by an average of 7.6 per cent of total employment annually; entering establishments did so at a rate of 1.6 per cent. The total annual job loss of some 8 per cent was about six times the short-run reallocation of 1.3 per cent given by the dissimilarity index, which measured short-run interindustry structural change between 1972 and 1981 for manufacturing industries at the two-digit level.

In the short run, much of the change in employment levels came from continuing establishment growth and decline. In the long run, this was no longer the case because the declining segment either exited or reversed its fortunes. When establishment status was compared in 1971 and 1981, the implicit annual exit rate was 2.05 per cent and the decline rate only 1.25 per cent. Exits were about twice as important as the decline in continuing establishment during the decadal comparison.

Even though the long-run annualized rate of gross job loss was less than the short-run rate, the cumulative amount of job decline in the long run was substantial. Some 19 per cent of 1971 employment disappeared by 1981 as a result of establishment exits and some 12 per cent as a result of establishment decline, for a total of 31 per cent. The cumulative annual rate of job decline of 3.6 per cent over the decade 1971-81 was also large relative to the amount of reallocation yielded by the interindustry structural change index when calculated over a similar period. For the period 1972-81, the cumulative measure of structural change yielded by the dissimilarity index was only about 0.36 percentage points of employment per year when reallocation is measured at the two-digit level. Therefore, whether the short or long run is used, producer job loss was found to be large relative to traditional measures of interindustry reallocation.

Long-run entry of new establishments was almost as important as the growth of continuing establishments for the creation of new jobs. Between 1971 and 1981, establishment entry added 19 per cent of 1971 employment in the manufacturing sector and the expansion of continuing establishments, another 21 per cent. Most of the employment created by new establishments came from firm entry rather than from continuing firms – almost 80 per cent when 1970 and 1979 are used for the endpoint comparisons. Therefore, contrary to the impression left by earlier studies, establishment exit and entry have a substantial cumulative effect over time, and much of this is related to the emergence of new firms and the exit of old ones.

This pattern of job change was not unique to Canada. The experience of the United States, France, West Germany, Sweden, Japan, and the United Kingdom was also examined. In general, the conclusions drawn about adjustment patterns for Canada were valid for these other countries.

The third area this study examined was the size of worker turnover. Here the data allow several improvements to our knowledge. First, separations are broken into sufficiently fine subdivisions to allay the criticism that most of the change caught by such data is either inconsequential or consists of such a miscellany that it is unrelated to the issue at hand – that being the matter of change brought about by restructuring. Separations can be broken into 10 categories: layoffs, labour disputes, return to school, illness/injury, quits, pregnancy, early retirement, work-sharing, apprenticeship training, and other. Outside of layoffs, quits, and the other category, the remaining categories individually accounted for a relatively small percentage of total separations on average. For instance, the return-to-school category accounted, on average, for only 3.9 per cent of total separations in all sectors of the Canadian economy between 1974 and 1986; illness or injury, for 3.8 per cent; and pregnancy, for only 2.2 per cent. Those who would argue that separations related to such factors should be removed from the analyses of change brought about by structural realignment can do so with this data. When this is done the residual is still large. On average, layoffs account for 44.2 per cent of all separations and quits for 23.7 per cent.

A more fundamental improvement to our knowledge arises from the breakdown that has been made in separations between those that are temporary and those that are permanent. Using longitudinal records, separations are divided into those who return to the same employer and those who do not within a two-year period from the initial separation. The former are termed temporary and the latter are called permanent, not because they fail necessarily to get further employment, but because change forces them to change their status. They either leave the labour force or move to a new employer. For layoffs, some 57 per cent of the total for all sectors returned to the same employer, on average, between 1974 and 1984; for quits, only 19 per cent did so. In the manufacturing sector, 61 per cent of all separations returned to the same employer between 1978 and 1984.

These data confirm the contention found in earlier studies that a substantial proportion of the layoff component of separations is related to short-run temporary fluctuations in producer fortunes. But they also reveal that layoffs and other attritions have a substantial permanent component. The permanent-layoff rate in all sectors averaged 8.3 per cent over the period 1974-83; in manufacturing, it averaged 7.8 per cent. In addition, the permanent-attrition rate (arising from separations from all causes other than layoffs) was at least equal to the permanent-layoff rate. Therefore, the separation data indicate that a substantial relocation of labour takes place annually in response to changes in job opportunities.

Some of the deficiencies of previous job-change and labour-turnover studies, then, have been rectified in this study. Linking the two is perhaps the most important contribution made herein. In the past, each type of study has generally been done independently of the other. Job-change studies alone beg the question of how employment change affects the labour force. Labour-turnover studies in isolation leave uncertainty as to how supply responds to changes in the demand for labour at the firm level.

This study has been able to relate job- and labour-turnover statistics to one another. For example, in the manufacturing sector, the short-run job-loss rate in declining and exiting establishments for the period 1974-81 averaged 9.1 per cent per year. Separations due to permanent layoffs averaged 7.5 per cent per year over the same period.

The close relationship between the annual rate of worker separations and the rate of short-run job change indicates that short-run job change studies can be used as proxies for labour turnover. Job change can be measured by comparing the employment of establishments between adjacent years (the short run) or over a longer period. Annualized rates of job change are greater when measured over adjacent years than over longer periods. The reason for this phenomenon lies in the fact that there is a transitory or temporary component to short-run change in continuing firm employment. Even when there is a trend in a firm's sales, there are substantial short-run deviations from the trend. Long-run job change reflects more permanent or structural changes that take place as firms grow and decline.

The existence of a difference between short- and long-run job change statistics has meant that job-change studies, without accompanying labour-turnover studies, cannot be used to infer the amount of reallocation being forced upon labour. Short-run job change may overestimate the actual displacement of workers. If short-run fluctuations in employment are transitory to the firm, they may also be so for workers. If year-to-year temporary fluctuations in firm employment lead primarily to temporary layoffs (workers who return to the same firm), then job-change figures derived from annual data may overestimate the amount of permanent-worker displacement.

The data presented in this study show this is not the case for Canada during the period studied. While there is a substantial proportion of total layoffs that is temporary, the permanent-layoff rate is equal to, or larger than, the short-term job-decline rate. Permanent layoffs are those workers who do not return to the same firm in the short or the longer run. Thus, while much of short-term fluctuations in employment may be transitory for the firm (that is, they will be partially reversed in the next period), this is not so for workers. While short-term job-loss rates may not reflect longer-run factors that lead to changes in firm position, they closely reflect the amount of reallocation that is imposed on the labour force.

The chief conclusion of this study is that labour reallocation, whether measured using jobs or worker separations, is large. While there is a substantial transitory component, the proportion that leads to permanent change (either in the producer relative position or in a worker's employer) is large. The implications are twofold. First, in the area of industrial economics, more attention needs to be paid to intraindustry change. Second, for all studies that involve considerations of the impact of policy change upon the labour force, more attention needs to be paid to the nature of the adjustment process. At the very least, the view that the world is relatively static and that the market system has little adaptive ability needs to be set aside.

A great deal remains to be done in the way of studies on the adaptive process; nevertheless, this study does make a limited contribution to our understanding of one aspect of the process – the extent to which entry and exit differ. The cumulative weight of these investigations, from time series, from cross-sections, from regressions, and from studies of other countries, suggests there is a significant difference between the two.

Exit is part of a self-selection phenomenon. While numerous exogenous changes in the environment, from technological progress to changes in trade policy, affect firms in any industry, the aggregate failure rate over time is relatively constant. This implies that it is not so much the type of exogenous shock that matters as the ability of management to adapt. In any population, there will be a relatively constant percentage who cannot do so, irrespective of the stock.

The evidence also indicates that in the long run, adjustment comes primarily on the entry side rather than the exit side. In a world where growth is generally positive, reallocation of resources from one industry to another occurs primarily through reduced entry rates and not higher exit rates; industries grow not so much by reducing exit rates relative to others as by increasing entry rates. Adaptation occurs because workers, who would normally lose their jobs as a result of firm decline, move to other firms that are growing. The mobility data presented in Chapter 7 show that workers, who are forced into unemployment by this process, are not confined to a narrow range of employers in the same industry. They transfer to other industries and occupations in a way that suggests substantial mobility. Sensible public policy in the area of adjustment assistance should facilitate, not hinder, this natural movement of workers who are being continually released.

While exit rates in general are relatively constant compared to entry rates, they do increase markedly in some situations. The recession of 1982-83 led to one such change. Obviously, if an industry begins to decline rapidly, the prevailing exit rate will increase. In these circumstances, workers who would not normally be forced to adjust will suddenly be required to do so. But even in these circumstances, part of the adjustment in net employment levels comes from a reduction in new employment from entry, rather than just an increase in lost jobs due to exits. The exact proportion depends on the rate of decline. Over the 1970s, using two-digit manufacturing data, generally about half of the decline in net employment growth that was due to changes in entry plus exit resulted from changes in entry.

To summarize, rough estimates of the extent to which jobs will disappear in an industry as a result of trade liberalization or any other cause should not be equated to the number of additional workers who will lose their jobs. Part of the adjustment may be absorbed by the "normal" rate of job loss due to exit that would have taken place in any case. Part of the job loss will be absorbed by less entry. The exact amount of the job loss that will result in additional exits will depend upon the rate of industry decline. Finally, job loss is not the same as forced worker separations. In order to infer what a given amount of job loss means for the labour force, the relationship between job or position change and separations needs to be taken into account.

Nothing that has been said herein should be taken to mean that change is costless or that it is easily accomplished. In the process, some workers experience considerable income loss and some investors lose the capital they have put at risk. On the other hand, change brings benefits that are less easily quantifiable. Workers move from one firm to another, in some instances, to improve their career and income levels. Firms that have failed are replaced by those that have lower costs or better products. Consumers are made better off by this process.

Nor does this study argue that additional change from any source – including trade liberalization – can be accomplished without increasing the costs of adjustment that are presently being incurred. It is conceivable that some events could so increase the amount of job loss that the normal adaptive mechanisms will break down. The adaptive process is only just beginning to be understood. Further work with the administrative databases that have been used herein can shed light on when that adaptive process works well, and when it becomes overloaded.

To do so, a number of questions need to be examined. To what extent do multi-establishment firms supplant the external labour market and transfer workers internally? Do firms that exit and enter employ workers with different characteristics than do continuing firms? As firms decline, which workers are laid off first? If marginal adjustments occur first with those who have a large amount of adaptability, such as younger workers, how large do fluctuations have to become before those with less adaptability are laid off? While these are only a subset of the questions that can and should be answered, they are suggestive of a research agenda that needs to be pursued.

These questions have not been addressed herein. An empirical study must of necessity have relatively modest objectives. This study makes a first attempt to quantify the amount and pattern of change that is ongoing in the Canadian economy. It will have been successful if it leads us to think about change as continuous rather than apocalyptic. In doing so, we are more likely to ask how improvements in the adaptive process can best be facilitated; if not, we are likely to oppose the type of adjustments required to improve social welfare.

A Estimating the Annual Rates of Structural Change for the Canadian Economy and the Manufacturing Sector

In Chapter 2, the degree of interindustry or intersectoral change was examined using a dissimilarity index. The plots of the average change per year, derived from the cumulative structural change index, followed a negative exponential, that is:

$$ACI\left(k, t_0\right) = Me^{-\alpha k}.$$

The coefficients for the regression

$$log\ (ACI) = M' - \alpha k$$

were estimated, where

ACI = average annual change derived from the cumulative index, and

k = time elapsed from base year, t_0.

This was done for several different structural indices. These are:

*L*61 – the 19 industry two-digit manufacturing sample to base year 1961.

Table A-1

Regression Coefficients for Average Annual Change Derived from Cumulative Dissimilarity Index on Time, for the Economy and the Manufacturing Sector, Canada, Selected Periods, 1947-83[1]

	Intercept	Time	$\bar{R}^2$	*F*	*PROB > F*
			(Per cent)		
*L*61	0.088 (0.078) [1.13]	–0.058 (0.014) [–4.05]	0.51	16.25	0.0012
*L*72	–1.042 (0.130) [–8.02]	–0.008 (0.009) [–0.92]	–0.01	0.844	0.3738
*L*118	0.539 (0.039) [13.91]	–0.054 (0.004) [–14.08]	0.93	198.3	0.0001
*L*47	0.376 (0.026) [14.61]	–0.017 (0.002) [–6.92]	0.76	47.86	0.0001
*L*12	–0.105 (0.039) [–2.73]	–0.010 (0.004) [–2.77]	0.31	7.68	0.015
*L*186	0.493 (0.046) [10.61]	–0.27 (0.004) [–5.92]	0.70	35.7	0.0001

1 Figures in parentheses are the standard error of the estimate, while figures in square brackets are the *t*-values. The level of industry aggregation and base year for which each of the equations was estimated, indicated by *L*61 to *L*186, is defined in the text.

SOURCE Charette et al. (1986), Table 2-2, p. 69, Table 2-7, pp. 82-3, and Table 2-11, pp. 94-5; and Economic Council of Canada, CANDIDE database, based on data from Statistics Canada.

*L*72 – the 19 industry two-digit manufacturing sample to base year 1972.

*L*118 – the Charette et al. (1986) 118 industry two-digit manufacturing sample to base year 1961.

*L*47 – the Charette et al. (1986) total economy 12-sector disaggregation to base year 1947.

*L*12 – the Charette et al. (1986) total economy 12-sector disaggregation to base year 1961.

*L*186 – the Charette et al. (1986) total economy 186-sector disaggregation to base year 1961.

The estimated coefficients are presented in Table A-1.

B Note on the Entry and Exit Methodology

This appendix describes the methodology used to generate the entry, exit, and continuing firm and establishment data presented in Chapter 3 of this study. Job-turnover data are presented both for establishments or plants and firms or enterprises.

The Definition of Establishment and Enterprise

The measurement of entry and exit uses two basic units of production: the establishment or plant, on the one hand, and the enterprise or firm, on the other. The terms establishment or plant and enterprise or firm are used interchangeably herein. Each of the terms needs to be carefully defined if the Canadian data are to be compared not only to those from other countries but also to other data sets for Canada.

An *establishment*, as defined by Statistics Canada (1979, p. 13), is "usually equivalent to a factory, plant or mill."[1] The focus of this appendix is confined to establishments that are classified to the manufacturing sector.[2] The establishment is the basic statistical unit from which information is collected for the annual Census of Manufactures.[3] Apart from mining and logging, which are part of this annual census, there exist no comparable data for other sectors of the Canadian economy.

An *enterprise* is defined, broadly speaking, for this study as all establishments in the manufacturing sector under common control (see Statistics Canada, 1979, pp. 17-8; and 1983*a*, pp. 23-5). An enterprise is thus a concept that does not necessarily coincide with the legal entity or what is sometimes referred to as the business or corporate entity. The relationship between the legal entity, the establishment, and the enterprise is summarized by Statistics Canada:

> There is in fact an intermediate level of organization between the establishment and the enterprise, the legal entity. This is the ownership unit. Legal entities may be incorporated or unincorporated businesses, or individuals. One legal entity may own another legal entity; therefore, it is possible for an enterprise to control more than one legal entity, just as a legal entity may own more that one operating unit (an establishment) (Statistics Canada, 1983*a*, p. 24).

In order to determine whether one legal entity controls another, attention is paid not only to cases where, directly or indirectly, one company "has more than 50 per cent of the exercisable voting rights of the subsidiary corporation" (Statistics Canada, 1979, p. 17), but also to cases of minority control, "if factual information exists or acknowledgement by the entity in question is obtained" (Statistics Canada, 1983*a*, p. 25).

Dating Entry and Exit for Enterprises and Plants

Each establishment is assigned a unique identification number, the record serial number or RSN.[4] This number remains with the establishment for every year that it completes an annual Census of Manufactures questionnaire (McVey, 1981, p. 72). Each enterprise is also assigned a unique ENT code. Unlike an establishment's RSN, the enterprise code can change when one enterprise (the buyer) purchases another enterprise (the acquired or seller).

In order to quantify rates of entry and exit, the following approach was adopted:

1) if the establishment or enterprise completed a questionnaire for the annual Census of Manufactures in year t and $t + n$, the establishment or enterprise is classified as *continuing* over the period n;

2) the first year that an establishment or enterprise is recorded as completing a questionnaire for the annual Census of Manufactures is the year it is classified as an *entrant*; and

3) the last year an establishment or enterprise is recorded as completing a questionnaire for the annual Census of Manufactures is the year it is classified as an *exit*.

When annual data are generated, n is set equal to 1 for continuing enterprise and establishments. Thus, annual entry, exit, and continuing enterprises or establishment statistics are generated by comparing two adjacent years to see whether the enterprise or the establishments it owns filed an annual Census of Manufactures questionnaire in one or both years.

Validation of Identifiers

Entry and exit are measured by examining changes in enterprise and establishment identifiers. This section examines the reasons why these identifiers appear and disappear.

The Establishment Code

Plant entry and exit are defined to occur with the appearance and the disappearance of an establishment code. Whether this definition produces meaningful estimates of births and deaths depends upon the practice of the statistical agency in assigning establishment codes. The closure of an establishment is usually grounds for the retirement of a code; but there may be situations where continuing plants are reassigned codes – where the old code is dropped and a new one assigned. If continuing establishments are reassigned codes, then exit and entry rates will both be overestimated.

Difficulties in this area arise because establishments, like firms, possess several characteristics. Some, but not all, can change during the lifetime of a plant and the administrative coding system may reassign plant numbers not just when the plant closes but also when other characteristics change. For instance, if changes in one of those characteristics – ownership – trigger the reassignment of a code, then death and birth will not correspond to the opening and closure of a plant.

The meaning of birth and death, then, depends upon the type of events that are significant enough to cause the statistical agency to reassign codes to plants that have not shut down. The rule used by Statistics Canada is to discard a code in the case of a continuing plant and to assign a new one only if location, ownership, and name of the establishment *all* change simultaneously.[5] This rule precludes counting as an establishment death the situation where there has just been a change in ownership or in the name of the plant.

The validity of entry measures that are developed, then, depends upon the diligence with which Statistics Canada followed this rule. Several tests were employed to examine this. We concluded that because of the nature of the criteria used for the reassignment of the plant identifier and the care used by Statistics Canada in following this criteria, the emergence of new establishment codes and the disappearance of old ones in the Canadian Census of Manufactures can be ascribed to "real" births and deaths with an error rate of less than 0.1 per cent. This is not the case in some other databases where a change in legal entity is often sufficient to cause a code to be dropped and a new one to be created.[6]

The Enterprise Code

Enterprise identifiers (ENT codes) were used to track groups of establishments under common control over time. The same ENT identifier was used on all plants in manufacturing, logging, and mining owned by the same enterprise. This is not a code that corresponds to the legal entity, but one that is meant to relate to the concept of an enterprise that was discussed previously. Legal entity (Business Register Identification or BRID) codes do exist; new values of these codes are created and old ones discarded with a change in legal entity – such as an incorporation, an amalgamation, or a reorganization of establishments. Since the legal entity changes much more frequently than does the enterprise that controls the legal entity, the use of a BRID code can generate "false" births and deaths. These are false for the purposes of this study.

As in the case of the establishment codes, an extensive set of validation checks were carried out to ascertain that changes in the ENT codes corresponded only to major changes in corporate organization. Our validation checks with regard to the enterprise identifiers indicate that changes therein capture important economic events. They are not mere name changes, minor corporate reorganizations, or coding errors (for further details, see Baldwin and Gorecki, 1988).

Implementation Problems: General Issues

Coverage

The usefulness of entry and exit statistics produced by a database will depend upon the coverage of the universe of firms and plants. Databases like the Dun and Bradstreet records used by Birch (1979, 1981, 1987) and the U.S. Small Business Administration (1984) are incomplete – being constructed only from the records of those companies that wish to be placed on these files for credit-rating purposes.[7] Other databases, like the ones constructed by Storey (1985) and his colleagues in the United Kingdom, are built from different sources, none of which purports to be a complete census.

Use of the Canadian Census of Manufactures to measure entry and exit overcomes these problems in large part. The Canadian data is collected by the official statistics agency and, therefore, has the professional expertise and extensive coverage associated with the collection of national censuses.

Problems can also arise in coverage not so much because it is incomplete, but because it is not current or because it changes over time. This is often the result of there being a lag in adding new firms to a database or in purging it of firms that have exited. Sudden bursts of administrative activity to update these files and catch new firms that may have been missed or to purge the files of defunct producers can generate a spurious level of births and deaths for a particular year. Johnson and Storey (1985), for instance, warn that there were sudden purges of the Dun and Bradstreet file in the late 1970s that lead to biases in exit rates calculated with this database. Similarly, they point out that new firms are entered in the database with such a lag that measuring entry and exit on an annual basis is impractical.

Because the Canadian Census of Manufactures is an annual census, it is generally not affected by these problems. An effective method for finding new firms exists – through the use of administrative tax files. Moreover, failure of a previously existing producer to file a census return is followed up by trained personnel to ascertain the status of the firm or plant. The Canadian census is, therefore, current. Meaningful annual rates of entry and exit can be derived therefrom. There will be some lags and omissions, but they will be minimal compared to alternate sources.

The Canadian census data is not, however, completely immune from the problem of changing coverage over time. This problem can also be found, for instance, in the U.S. Dun and Bradstreet records. However, information exists that allows the precise effect of changing census coverage to be estimated.

A major change in coverage in the Canadian Census of Manufactures occurred in 1978. In 1972, Statistics Canada lost a source of administrative information used to identify possible new establishments (Potter, 1982, p. 21). The result was a decline in coverage that was not rectified until 1978 and, to a lesser extent, 1979. In 1978, for example, 3,820 new establishments were added to the Census of Manufactures that Statistics Canada believed were already in existence. These "new" units accounted for 12 per cent of the total establishment count in 1978; however, since the majority were very small, the increase in manufactured shipments due to their addition was much less significant. These "new" establishments accounted for only 1.7 per cent of the 1978 employment total (Statistics Canada, 1980*b*, p. ix). In 1979, a further 1,142 pre-existing establishments were added because of improvements in coverage. They accounted for only 3.3 per cent of the 1979 establishment total and 0.37 per cent of the employment total (Statistics Canada, 1982*a*, p. x). In both years, the additions, which were due to improved coverage, were quite small.

In this study, the database that has been developed to measure entry and exit in the long run should not be affected by this problem since much of the missed entrants in the mid-1970s will have been restored by 1979; however, the establishment and enterprise databases that are used to measure annual rates of entry were affected and modifications were required to handle this problem. These are discussed in a following section.

Sample Choice

The advantage of using an official census is based on the extensive coverage such data provide. The disadvantage is that it can be extremely costly to employ all records for the analysis. Moreover, it must be remembered that not all records are of equal quality.

An establishment that is surveyed directly by Statistics Canada for the annual Census of Manufactures may receive either a long-form or a short-form questionnaire. The distinction between the two is:

> The long form is a fully detailed questionnaire sent to establishments with shipments above minimum sizes which vary by province and by industry and from year to year, designed to capture all but a small percentage of the shipments of the industry. In 1975 long forms accounted for all but 4.1 per cent of the value of shipments of goods of own manufacture of the manufacturing industries. The short form is a simplified, abbreviated questionnaire, bearing a closer resemblance to a typical income statement. It is sent to small manufacturers whose company shipments fall below a minimum size (Statistics Canada, 1979, p. 10).

In addition, data for very small plants are taken from taxation administrative records in place of mailed short-form questionnaires. In the late 1970s and early 1980s, both types of small establishments[8] accounted for 5 per cent or less of all manufacturing shipments: 2.0 per cent in 1970, 4.1 per cent in 1975, and 3.4 per cent in 1982. In contrast, such establishments accounted for 40.0 per cent of all manufacturing sector establishments in 1970, 50.1 per cent in 1975, and 53.9 per cent in 1982 (Statistics Canada, 1979, p. 44; and 1984*c*, p. xiv).

Understanding the difference between large and small establishments is important because it is sometimes opportune, for cost reasons, to work with only a subset of all establishments when entry and exit are measured. Moreover, the creation and disappearance of small establishments may be sensitive to the diligence used in finding these small establishments. This, in turn, can vary year by year depending upon the budget constraints faced by the statistical agency and official concern about the paper burden imposed on smaller firms.

In this study, typically only long-form establishments are used for the reasons described.[9] The impact on our results of doing so was carefully investigated by comparing entry and exit rates using the universe of census establishments and just the long-form sample. For this purpose, the longer-run database with initial and terminal years of 1970 and 1979, respectively, was employed. The long-form sample yields a lower rate of entry and exit than the entire sample when the number of plants and enterprises is employed; but its use does not greatly affect the estimate of the rate of entry when measured in terms of employment or shipments. Small plants, as defined by Statistics Canada, are numerous but account for an insignificant percentage of total employment. Moreover, the use of the long-form sample means that more characteristics of entrants can be measured consistently, because the long-form data contain more detailed information on plants' activities and because certain concepts, such as value added, are not defined in the same way for long and short forms (Statistics Canada, 1979, p. 42).

An enterprise is defined in the Census of Manufactures in terms of the establishments it owns. The establishments of larger enterprises tend to be classified as long-form; small enterprises as short-form. The same reasons that led to the selection of only long-form establishments also determined the choice of enterprises that only owned long-form establishments.

Adoption of the long-form sample does create certain additional problems. The cutoff between a short- and a long-form establishment was changed drastically in 1975. This does not create a major problem for the longer-run comparisons between 1970 and 1979. It would do so if a comparison were being made of the periods 1970-75 and 1976-80 because there would be slightly fewer births in the latter period. It creates more of a problem for the measurement of annual rates of entry and exit. Discussion of this will be found in a subsequent section.

Units of Measurement

The importance of entry can be measured in terms of the number of establishments and enterprises, or their outputs and their inputs. Both sets of measures are used. Numbers reveal whether entry and exit are easy; an output or input size measure, whether they are important. Employment is used in this study because the contribution of entry to job turnover is to be investigated.

Throughout, employment is derived from the total activity statistics available from the census.[10] It is reported by the census as an annual equivalent. For example, if a plant employs 60 workers per month for six months, this is recorded as 30 person-years. In some cases, this procedure might produce a downward bias in the estimates of entry and exit – for 60 people instead of 30 are affected by the exit of the above-described plant. This, in turn, would affect calculated rates of entry and exit because, presumably, the employment of continuing plants, which forms an important part of the denominator of this calculation, will not be affected to the same degree by this factor. One approach would be to assume that entrants and exits are distributed uniformly across the year – that they have an average life of half a year. All raw employment figures for entry and exit would then be doubled.

This is not the practice that has been followed herein. It is felt that there is enough of a reporting lag in the census that, for example, employment totals for the first and last reporting year are essentially for a full-year operation. This was tested by examining employment in enterprises that exited, both in the year of exit and the preceding year. The differences were relatively minor and certainly not of an order of magnitude of 100 per cent, which the doubling rule would imply.

Implementation Issues: Specifics

A number of problems arose when short-run entry and exit were measured. These are discussed in the following two sections. The first deals with the establishment database; the second deals with the enterprise database.

The Annual Establishment Database

Choice of Sample

Entry and exit data can be generated using all establishments, just long-form establishments, or just short-form plants. Only long forms were used because, among other things, the constantly varying coverage of short forms would otherwise have given rise to specious entry and exit – especially in the case of the measurement of entry and exit annually. The long-form data are a close proxy for the results of the total census for the longer-run period from 1970 to 1979 – at least when entry is measured by the amount of shipments or employment affected.

For the short-run database, the use of long forms alone as a sample criterion is inadequate. The line of demarcation between short and long forms changed over time. Because of this, the use of long-form data alone would produce some changes in entry and exit purely as a result of reclassification. This problem was resolved by taking as the longitudinal establishment sample all establishments that always completed a long form as well as those that did so on at least one occasion. An establishment, then, is classified as entering in a particular year because it made its first appearance in that year and either was already a long-form establishment or eventually became one at a later date.

This technique serves to reduce, but not eliminate, the problems that shifting boundaries between short and long forms produce. It essentially smooths out the fluctuations by eliminating the most volatile component, which are establishments just at the boundary. Since the boundary changes are generally small, this is sufficient most of the time; but there are two occasions when major changes in census coverage occurred. For these instances, corrections of the estimates of entry and exit were required.

Major Revision of the Long-Form Coverage in 1975

The cutoff between a short form and a long form suffered a major revision in 1975.[11] During the early 1970s, Statistics Canada raised the cutoff point slowly to maintain approximately the same percentage of establishments in each category. But in 1975, it was increased dramatically in order to reduce the respondent burden for smaller manufacturers. As a result, the proportion of establishments that sent short forms increased from 36.1 per cent in 1974 to 50.1 per cent in 1975. There was no subsequent increase of a similar magnitude in the proportion of establishments in the short-form category, though it did drift upwards slowly over time. By 1983, it was 54.9 per cent of all establishments, as compared to 50.1 per cent in 1975. Over the same period, the percentage of employees in short-form establishments increased slowly from 7.6 to 8.7 per cent.

The reclassification of the boundaries between the long and short forms in 1975 will have less of an effect on estimates of entry and exit with the use of the modified long-form sample adopted here.[12] This is because establishments that entered in 1975 as short-form establishments but eventually grew to become long-form establishments (albeit a harder task after 1975 because of the higher cutoff point used to define long-form establishments) will still be caught. However, it does not completely eliminate the problem. Those establishments that would have made the transition from a short form to a long form under the old definition, but do not do so under the new definition, will be missed. That there is some reduction in measured entry because of the 1975 change is evidenced by the increase in the average size of entering establishments that occurs subsequently. Entering establishments averaged 20 employees per establishment between 1970-71 to 1973-74, but 28 employees per establishment between 1975-76 and 1980-81. The increase in the plant average size occurred abruptly at the time of the reclassification of establishments between the long-form and short-form categories in 1975.

In order to calculate the effect of the 1975 redefinition on the estimated entry rates, the distribution of entrants in 1973-74 was truncated by removing the smallest entrants until the average size of those remaining was equal to the post-1975 size of the average entrant. On average, this required removing 32.1 per cent of entrants accounting for 4.5 per cent of employees of all entrants. This is the estimate of the percentage reduction in the pre-1975 entry figures required to make them comparable to those calculated for the remainder of the period.[13]

Variation in Census Coverage

Reliance on the long-form sample produces a second measurement problem that is revealed by the data presented in Table B-1. Column 1 contains the number of establishments that filed an annual Census of Manufactures questionnaire – whether it was the long or short form. Column 2 contains the number of establishments defined for inclusion in the longitudinal database – those completing a long-form questionnaire at least once. The coverage of the establishment sample (column 3) declines over time, reflecting the reliance on long forms in this study and their decreasing importance in terms of the number of establishments over time. This should not greatly affect the rate of entry and exit when calculated as a proportion of the number of firms or establishments. The bias will be even less where entry and exit are measured in terms of employment because of the relatively small size of the short-form establishments.

The second problem arose because of a major change in census coverage in the late 1970s that, if left uncorrected, would have given a false increase in the entry reported in 1978 and underreported both entry and exit in prior years.

Annual rates of entry for the manufacturing sector as a whole are presented in Table B-2. They are calculated using the number of new establishments relative to the total establishment count in the previous year and the employment in new establishments as a percentage of employment in the previous year. Columns 1 and 3 contain the estimated rates of entry prior to corrections. Rates of establishment exit are presented in Table B-3 – once again, columns 1 and 3 contain the estimates prior to any corrections. The entry rates, even though based on long-form establishments, or those that would eventually become ones, do show an abnormal increase in 1978 (see Table B-2, column 1).

In order to correct for the change in coverage, the number of entrants and the employment associated with them that resulted from the increased coverage were identified and used to correct the entry and exit rates presented in column 1 of both Tables B-2 and B-3. The correction employed for the 1978 and 1979 rates was straightforward – the overlap was subtracted. The correction for previous years was more complicated.

Table B-1

Number of Enterprises and Establishments Classified to the Manufacturing Sector[1] Using Various Criteria, Canada, 1971-82

	Establishments classified to the manufacturing sector			Enterprises classified to the manufacturing sector		
	As recorded in Statistics Canada publications[2] (1)	As defined in this study[3] (2)	Ratio (2)/(1) (3)	As recorded in Statistics Canada publications[4] (4)	As defined in this study[5] (5)	Ratio (5)/(4) (6)
1971	31,908	21,948	68.79	..	17,402	..
1972	31,553	21,896	69.39	26,926	17,265	64.12
1973	31,145	21,823	70.07	..	17,163	..
1974	31,535	22,126	70.16	26,875	17,413	64.79
1975	30,100	21,959	72.95	..	17,044	..
1976	29,053	21,530	74.11	..	16,602	..
1977	27,716	20,797	75.04	..	15,939	..
1978	31,963	21,846	68.35	26,865	16,739	62.31
1979	34,578	21,986	63.58	..	16,812	..
1980	35,495	22,077	62.20	30,160	16,715	55.42
1981	35,780	21,659	60.53	30,270	16,179	53.45
1982	35,834	21,212	59.20	30,364	15,725	51.79

1 Defined using the 1970 SIC definition of the manufacturing sector.
2 Statistics Canada (1984*c*), Table 1, p. 2.
3 For details see text.
4 Statistics Canada (1983*a*), Text Table VII, p. 15, for 1978 and 1980, the corresponding table in earlier issues of this biannual publication, and preliminary data made available to the authors for 1981 and 1982. Prior to 1980, the data were published biannually. No data were published for 1970 or 1976.
5 For details see text.

SOURCE Various published and unpublished tabulations provided by Statistics Canada. See notes for details.

Table B-2

Annual Establishment Entry Rates in the Manufacturing Sector, Corrected and Uncorrected for Coverage Changes, Canada, 1970-83

	Entry rates using number of establishments		Entry rates using employment	
	Uncorrected (1)	Corrected[1] (2)	Uncorrected (3)	Corrected[1] (4)
		(Per cent)		
1970-71	3.39	2.31	2.22	2.12
1971-72	4.50	4.44	1.23	1.84
1972-73	4.82	4.67	1.18	1.80
1973-74	5.56	5.30	1.44	2.12
1974-75	4.74	6.52	1.45	2.13
1975-76	2.76	3.75	1.05	1.14
1976-77	1.84	2.22	0.68	0.90
1977-78	10.34	4.10	3.34	1.49
1978-79	4.84	3.46	1.65	1.14
1979-80	5.00	5.00	1.77	1.77
1980-81	3.42	3.42	1.27	1.27
1981-82	6.12	6.12	2.21	2.21
1982-83	4.59	4.59	1.58	1.58
Mean	4.73	4.30	1.60	1.65

1 See text for coverage correction methodology.
SOURCE Special tabulations provided by Statistics Canada.

Because of the high death rate for new entrants, simple assignment of the 1978 and 1979 increased coverage figures to the earlier years would have understated earlier births. To correct for this, two assumptions were made: first, the total number of births missed was distributed across the years 1972 to 1977 in proportion to those actually reported;[14] second, the missed entrants died at the same rate after birth as those entrants actually reported. These two assumptions allowed estimation of the missing entrants by year between 1972 and 1977. The associated employment was calculated by assuming that the number of employees in each missed birth was the same as the average in those actually captured. The corrected entry rates are reported in columns 2 and 4 of Table B-2.

The uncorrected exit rates contained in columns 1 and 3 of Table B-3 were also revised to allow for the fact that the undercoverage of entry in the mid-1970s would have led to a downward bias in exits as well. Once again, the data for the rate of exit of new firm births were used and applied to the additional entrants. The corrected exit rates for the number of establishments and for employment affected by plant closure are reported in columns 2 and 4, respectively.

It should be noted that the corrections have virtually no effect on the average rate of entry calculated over the decade.

The Annual Enterprise Database

An enterprise is defined as all establishments in manufacturing and primary industries under common control.[15] If more of the enterprise's activity is classified to a four-digit manufacturing industry than any four-digit industry in mining or logging, then the enterprise is classified to the manufacturing sector.[16] Our sample of enterprises used for the short-run database consists of those classified to the manufacturing sector.[17]

Table B-3

Annual Establishment Exit Rates in the Manufacturing Sector, Corrected and Uncorrected for Coverage Changes, Canada, 1970-83

	Exit rates using number of establishments		Exit rates using employment	
	Uncorrected (1)	Corrected[1] (2)	Uncorrected (3)	Corrected[1] (4)
		(Per cent)		
1970-71	4.91	4.91	1.80	1.80
1971-72	5.14	5.43	1.87	1.96
1972-73	4.15	4.40	1.50	1.59
1973-74	5.53	5.99	1.57	1.77
1974-75	4.80	5.29	1.65	1.88
1975-76	5.11	5.55	2.18	2.45
1976-77	5.08	5.45	1.83	2.09
1977-78	4.42	4.29	1.78	1.86
1978-79	4.58	4.53	1.42	1.42
1979-80	5.40	5.40	1.90	1.90
1980-81	7.97	7.97	2.61	2.61
1981-82	5.92	5.92	2.53	2.53
1982-83	5.25	5.25	2.22	2.22
Mean	5.25	5.41	1.91	2.01

1 See text for coverage correction methodology.
SOURCE Special tabulations provided by Statistics Canada.

Choice of Sample

In the previous discussion, several reasons were adduced for excluding short-form establishments. These arguments also apply for enterprises that own short-form establishments. Such enterprises will tend to be almost exclusively single-establishment enterprises, since establishments belonging to multi-industry, multi-establishment enterprises always complete long-form questionnaires (Statistics Canada, 1979, p. 43; McVey, 1981, p. 71). Establishments that belong to single-industry, multi-establishment enterprises are also likely to complete a long-form questionnaire, since they are large compared to single-establishment enterprises (for details, see Statistics Canada, 1983*a*, Text Table VII, p. 15). In view of these factors it was decided to exclude enterprises that (a) *always* owned only a single establishment (using the multi/single establishment code), and (b) whose establishments *always* completed a short-form questionnaire.

The sample of enterprises thus consists of those classified to the manufacturing sector, but it excludes those enterprises that always owned a single establishment that in turn always completed a short-form questionnaire for the annual Census of Manufactures. In Table B-1, the number of consolidated enterprises classified to the manufacturing sector and the number in the subset selected for use in this study are tabulated. Typically, the enterprise coverage is somewhat lower than the establishment coverage (columns 3 and 6), reflecting the fact that a multi-establishment enterprise is counted once in the enterprise sector, but more than once in the establishment sector, and that single-establishment short-form enterprises are excluded.

Treatment of Temporary Exits

In a small number of instances, a plant or all of the establishments owned by an enterprise failed to report for a given year, but reported prior and subsequent to that year. If the rules outlined above were used, these would have been classified as exits and subsequent entries, rather than as a continuing plant or enterprise. Officials at Statistics Canada suggested that such failure to report could be due to a number of factors: a fire at the plant; a strike; a major overhaul of equipment; or slack demand. These situations were reclassified and the plant or firm was counted as continuing rather than as an exit or entrant.

The Possibility of Switches

The final problem relates to the possibility that plant exit did not so much involve what in our parlance is plant closure as plant reassignment.

At the aggregate manufacturing level being used to examine entry and exit in the short run, it may be that firms exit from manufacturing by switching to wholesaling. This would be recorded as an exit in our data because the enterprise ceases to file a Census of Manufactures questionnaire. While certainly an exit, it is not a closure, and for some purposes this type of reassignment might best be excluded from the analysis.

It is possible, with the databases at Statistics Canada, to trace an enterprise and the establishments it owns if they leave the manufacturing sector to switch to the wholesale/retail sector. However, after some preliminary research, the cost of this procedure became exorbitant. Hence, a second-best option was selected.

The data available from the Census of Manufactures permit the issue of exit to wholesaling to be explored in an alternate way. Each plant records its activities under two broad headings: manufacturing activity and nonmanufacturing activity. The sum of the two is total activity. An important component of nonmanufacturing activity is the purchase of goods for resale in the same condition as purchased (for details, see Statistics Canada, 1979, p. 37). This is essentially a wholesaling operation. Hence, by estimating, for the enterprise which is classified as an exit by closure, the ratio of manufacturing shipments to total activity shipments, an indicator of the importance of wholesaling operations just prior to exit may be generated. The higher is this ratio, the lower is the probability that the enterprise exited by switching its function to wholesaling. The results for a sample year are presented in Table B-4. The enterprises are classified according to the ratio of manufacturing to total shipments in the year of exit. As will be readily apparent, the majority of enterprises that exit by plant scrapping are indeed almost certainly genuine exits, given the small amount of nonmanufacturing activity. Hence the issue was pursued no further.

Determination of the Entry and Exit Method

The definition of enterprise exit and entry in the previous section made no attempt to distinguish between the method of entry and exit. An enterprise may exit the manufacturing sector by either closing all of the plants it

Table B-4

Ratio of Manufacturing to Total Shipments[1] for Enterprises that Exited[2] the Manufacturing Sector in 1982,[3] Canada

	Enterprises classified to each category		Manufacturing shipments classified to each category (per cent)
	Per cent	Number	
Ratio of manufacturing to total shipments:			
0.00–0.0999	0.17	1	0.00
0.10–0.1999	0.51	3	0.14
0.20–0.2999	1.20	7	0.49
0.30–0.3999	2.05	12	1.80
0.40–0.4999	1.20	7	0.66
0.50–0.5999	2.56	15	5.61
0.60–0.6999	2.56	15	2.19
0.70–0.7999	3.08	18	3.27
0.80–0.8999	4.27	25	4.13
0.90–0.9999	11.11	65	30.57
1.000	71.28	417	51.14
Total[4]	100.00	585	100.00

1 These ratios are built up from data reported by each establishment which has completed a Census of Manufactures questionnaire. However, for short-form questionnaires the distinction between manufacturing and total shipments cannot be made. Hence, the table refers only to enterprises which exited in 1982 and which had at least one long-form questionnaire in that year.
2 Where the method of exit is by plant closure.
3 Using the 1980 SIC.
4 May not add up to total due to rounding.
SOURCE Special tabulations provided by Statistics Canada.

owns or by selling its plants to another enterprise(s) – by divestiture. Equally, an enterprise may enter the manufacturing sector by building a new plant or by purchasing plants of existing enterprises – by acquisition. In the analysis of long-run enterprise entry and exit, these alternate methods of entry and exit were differentiated.[18] The same distinction is made for the short-run estimates.

In considering the method of entry in the short run, the following approach was used to determine if the firm entered by acquisition or plant creation. If the entrant first filed an annual Census of Manufactures questionnaire in a particular year *and* the establishment(s) it owned in that year existed in the previous year, then the firm is classified as having entered by acquisition; if the plants did not exist in the previous year, then the enterprise is classified as having entered by plant creation. The same approach was used to distinguish the method of exit. If the exiting firm last filed an annual Census of Manufactures questionnaire in a particular year and the plants it owned in that year were still alive in the next or subsequent year (but under a different owner), then the firm is classified as exiting by divestiture; if the plants did not file a questionnaire in the next subsequent year, then the firm is classified as exiting by plant closure.[19]

A potential problem may arise if either an enterprise enters by *both* acquiring plants and building new plants, or an enterprise exits by *both* divestiture and scrapping. This could be handled by counting the firm twice or by creating a new category – entry by both acquisition and building of new plants. Alternately, this firm could be assigned to one or the other category on the basis of the importance of the plants created in comparison to the plants acquired.

The implications of using the first approach can be ascertained from the data that were used to measure long-run entry and exit – using the database that relied upon 1970 and 1979 as endpoints. While some firms entered by both building a new plant and by acquiring it, the overlap was relatively small. These data come from comparing firm status in 1970 and 1979. This period spanned a full decade. The possibility that a firm could enter by one route and then expand by the other was estimated as being greater for a 10-year period than for the annual period adopted to measure short-run entry. Thus, there would be much less overlap between the two methods of entry in any study which relies upon annual data.

In view of this, it was decided that it would be appropriate to count an entrant as either entering by plant creation or by plant acquisition. Therefore, an enterprise entrant was assigned to one or the other of the two entry categories on the basis of the employment in the plants created versus the plants acquired. In those cases where an enterprise was classified as a multi-plant, care was exercised to make sure the appropriate choice had been made.

C Job Change in Canada Using the Longitudinal Employment Data File

This appendix provides estimates of the percentage rates of job change in continuing firms that expand or contract and in entering and exiting firms. These estimates refer to both short-run (annual rates for the period 1978-86) and long-run (1978 compared with 1986) job change and cover nine sectors: primary; mines, quarries, and oil wells; manufacturing; construction; transportation, communications, and other utilities; wholesale trade; retail trade; finance, insurance, and real estate; and community, business, and personal services – as well as the entire economy (less public administration). The data come from the Longitudinal Employment Analysis Program (LEAP) file developed by the Business Microdata Integration and Analysis group, now the Business and Labour Market Analysis Group, from Statistics Canada. In this appendix, the LEAP data are briefly described, comparisons with the Census of Manufactures are presented, caveats concerning their usefulness are outlined, and the appendix tables are summarized. A more detailed description of the LEAP data is found in Statistics Canada (1988).

The LEAP Data Set: A Brief Description

The employment record of a firm is derived from the Revenue Canada taxation data that each employer must file. These taxation data contain, *inter alia*, gross earnings for the calendar year, the province where the income was earned, and the premiums paid towards unemployment insurance and the Canada or Quebec Pension Plans. They cover each individual who earned $500 or more from any single employer in any year from 1978 to 1986. These files are aggregated to the level of a company, using Statistics Canada's Business Register firm identifier, thus yielding the company's total payroll and other annual totals, but *not* employment, initially.

In order to derive company employment data, Statistics Canada estimates average labour units (ALUs) by dividing a firm's annual payroll by estimates, separately derived, of average annual earnings. Separate average annual earnings are computed for each (three-digit SIC) industry-province combination. Yearly earnings are computed by multiplying average monthly earnings by 12. Average monthly earnings for the period 1978-82 were calculated using the Labour Division's ES-1 (firms of 20 employees or more) survey. This survey covers all employees in these firms who were issued T4 supplementary tax records (T4s). Employees earning less than $500 a year may be excluded as this is the cutoff for the mandatory issuance of T4s. For the period 1983-86, the average wage was calculated using the Statistics Canada Survey of Employment, Payroll and Hours (SEPH), which covers all firms. The 1978-82 data were then revised to make them comparable to the latter. Nevertheless, there is a discontinuity in the series between 1982 and 1983 that should be taken into account when interpreting the accompanying tables.

The concept of a firm used by the LEAP file needs elaboration. The payroll data is filed by employers with Revenue Canada. Accompanying every filing is the employer's Revenue Canada Taxation identification number – a payroll deduction account number (PAYDAC or PD number). Employers may have more than one PD number. Statistics Canada maintains a Business Register where businesses are assigned a Business Register Identification (BRID) number. Statistics Canada basically chooses to use the legal entity for the incorporated sector when assigning BRID numbers. This BRID number is linked to the PD numbers and information associated with them can be aggregated into a single BRID number. The BRID code is assigned an SIC code on the basis of the major industry activity of the business.[1] Not all payroll accounts encompass only a single industry, although many do; therefore, some employment assigned to an SIC industry will actually be in another industry.

In an earlier study (Baldwin and Gorecki, 1983), a firm was defined as all establishments within a four-digit SIC manufacturing industry under common control. In the work reported in Chapter 3, a firm is defined at the level of the manufacturing sector (Appendix B). It could be defined at a higher level; but the higher the level of aggregation, the more difficult it is to assign the job-creation statistics of a firm wholly to a particular industry.

The level of aggregation associated with the use of BRID numbers to identify a business is less than the highest level (all establishments under common control). The lower bound is given by the extent of aggregation already inherent in the PAYDAC numbers. The level of aggregation inherent in the use of BRID numbers to define a firm can be investigated by comparing the number of businesses and employment generated by the LEAP file for manufacturing to the number of firms and employment in the complete Census of Manufactures and in the truncated Census of Manufactures file that was used in Chapter 3 and discussed in Appendix B.

For 1978, the truncated sample of firms from the census had only 59 per cent of those present in the entire census, but employment in these firms was equal to 94 per cent of total employment in the census.[2] In contrast, the number of manufacturing businesses in the LEAP file is greater than the number of firms in the entire census file (some 41.1 thousand compared to 26.9 thousand in 1978). This means that Census of Manufactures firms have more than one BRID number on average. Employment totals in the LEAP file are also somewhat higher than for the census totals (2.1 million compared to 1.8 million in 1978). One of the reasons for this is that the Census of Manufactures attempts to ensure that only production and related workers in manufacturing are included in establishment totals. No such effort is made in the PD accounts. Therefore, peripheral workers (in construction and sales) are probably included in the LEAP file manufacturing sector estimates. Another reason for the difference is that the Census of Manufactures may lag somewhat in catching new firms that taxation files pick up quickly.

Some Caveats

The strength of the LEAP database is its inclusion of sectors other than just manufacturing. Moreover, the requirements of the Tax Act and the level of compliance by the Canadian public, it is felt, lead to excellent coverage. The major problem of multiple tax record units has been handled at Statistics Canada by careful matchings of multiple reporting units to one company. In addition, Statistics Canada has performed quality checks to try to ensure that new company codes do not emerge when new establishments, which were really part of existing companies, were created. Notwithstanding the care exercised by Statistics Canada in the development of the database, there are certain facets of the LEAP file that should be kept in mind when interpreting the data on job change that it produces.

First, the employment concept used, the average labour unit, is different than that used by the Census of Manufactures in that it is calculated indirectly. It is not a direct measure based on a survey of the number of workers employed. As with the Census of Manufactures, the LEAP measure does not allow a distinction to be made between full-time but seasonal employment or full-year but part-time employment. Like the census employment numbers that were used in Chapter 3, the LEAP file does not distinguish between a full-time job requiring 40 hours per week and one requiring either more or less hours. On the other hand, it does yield a summary statistic that gives a single measure that can be easily compared across industries.

Second, job change and turnover in the LEAP file, as presently constituted, is not synonymous with job creation or destruction. Continuing firms are divided into those that expand employment and those that contract employment. In addition, the effect of firm exits (those not there in the terminal year but there in the initial year) and entry (the reverse) on employment are also calculated.[3] This allows data on job growth and job loss from both these sources to be summarized on a year-to-year basis. However, firm entry in the LEAP file can arise from plant creation, from mergers, or from a change in legal status (unincorporated to incorporated). As discussed in Chapter 4, mergers are of substantial and variable importance. The firm data, then, on job change related to births and deaths contain a component related to new jobs (or lost jobs) and a component that results from transferred jobs due to mergers.

Because of the way in which the BRID number is assigned, this is unlikely to cause a large upward bias in the entry numbers at the broad sectorial level. For manufacturing, the entry category essentially covers new firms that create plants; the exit category covers exiting firms by way of closed plants; and the continuing firm category closely duplicates the continuing establishment growth and decline rates. Nevertheless, there is a bias in the exit and entry numbers, and they should be used with caution. The error rate in the gross job-gain and -loss rates is lower. This is discussed at greater length in Chapter 4.

Third, since the LEAP data on job change are produced at the firm level, it is likely that some of the job creation assigned to an industry is not found in the industry but originates elsewhere. A firm is classified to an industry on the basis of the major activity of its units. Therefore, widely diversified firms will cause a certain degree of imprecision in the data presented here. On the other hand, for the level of aggregation used herein, this is not likely to be a large problem. Businesses are narrowly defined in the LEAP file. There are considerably more businesses in the LEAP file for the manufacturing sector than firms in the Census of Manufactures, where the firm is defined as all establishments in the manufacturing sector under common control. It may be a greater problem for job-change statistics calculated from the LEAP file for finer levels of industry detail.

Fourth, the average wage used to derive employment from payroll data is not allowed to vary across firm size classes. To the extent that small firms pay lower wage rates, use of a single average wage rate will bias downward estimates of employment in small firms. But it should have much less of a bias for the rates of entry and exit calculated in Chapters 4 and 8, because the same bias affects both the numerator and the denominator of the estimated rates.

The Appendix Tables

Tables C-1 to C-10 present job change for various firm categories for both the economy as a whole (less public administration) and for nine sectors. The job-change categories follow those in Figure 1-1. The 1970 SIC was used to define the sectors of the economy. The level of industry aggregation was the divisional level, with some exceptions.[4] The LEAP file used to generate the tables in the appendix and in the main report was that of February 1989, the latest available.[5]

Table C-1

Source of Firm Job Gain and Loss in All Sectors, Canada, 1978-86[1]

	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1978-86
					(Thousands)				
Base-year employment[2]	8,301.5	8,702.7	8,955.2	9,178.4	8,858.6	8,571.5	9,014.0	9,378.7	8,301.5
					(Percentage of base-year employment)				
Net employment change	4.8	2.9	2.5	–3.5	–3.2	5.2	4.0	3.6	17.0
Continuing firms (net)[3]	4.4	2.5	2.2	–3.4	–3.2	5.1	3.4	3.5	9.9
Expanding[4]	10.4	9.1	8.6	6.5	6.9	10.8	9.7	10.1	24.3
Contracting[5]	6.0	6.6	6.4	9.9	10.1	5.7	6.3	6.6	14.4
Entry and exit (net)[6]	0.4	0.4	0.2	–0.1	0.0	0.1	0.7	0.1	7.1
Entry[7]	2.6	2.4	2.4	2.0	2.3	2.7	2.9	2.5	25.3
Exit[8]	2.2	2.0	2.1	2.1	2.3	2.6	2.2	2.4	18.2
Gross job turnover[9]	21.2	20.2	19.5	20.5	21.5	21.8	21.0	21.7	82.1
Gross job gain[10]	13.0	11.6	11.0	8.5	9.1	13.5	12.5	12.6	49.6
Gross job loss[11]	8.2	8.7	8.5	12.0	12.4	8.3	8.5	9.0	32.5

1 All data for this and subsequent tables come from the February 1989 version of the LEAP file. Each cell in the table is estimated separately from the underlying data. Hence, due to rounding, relationships between cells in a column may not be exact.
2 Base- (or initial) year employment derived using the full-year equivalent based on the average labour unit measure of employment (see text) for all sectors less public administration.
3 The sum of employment change of expanding less contracting firms.
4 The change in employment in continuing firms that expanded employment.
5 The change in employment in continuing firms that contracted employment.
6 The sum of employment in entry less exit.
7 The employment in entering firms.
8 The employment in exiting firms.
9 The absolute sum of employment due to expansion, contraction, entry, and exit.
10 The sum of entry and expansion of continuing firms.
11 The sum of exit and contraction of continuing firms.
SOURCE Special tabulations provided by Statistics Canada.

Table C-2

Source of Firm Job Gain and Loss in the Primary Sector, Canada, 1978-86[1]

	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1978-86
					(Thousands)				
Base-year employment[2]	91.4	96.9	102.4	105.3	98.1	102.0	107.8	112.5	91.4
					(Percentage of base-year employment)				
Net employment change	6.0	5.7	2.9	–6.9	4.0	5.7	4.3	2.8	26.6
Continuing firms (net)[3]	3.4	1.9	0.5	–6.3	1.8	3.5	2.9	1.7	3.1
Expanding[4]	14.5	13.9	13.5	10.3	14.2	14.7	13.3	13.6	22.3
Contracting[5]	11.0	12.0	13.0	16.5	12.4	11.2	10.4	12.0	19.1
Entry and exit (net)[6]	2.6	3.7	2.4	–0.6	2.2	2.3	1.4	1.2	23.5
Entry[7]	7.0	8.1	7.6	5.6	6.1	6.5	5.6	5.9	53.7
Exit[8]	4.4	4.3	5.2	6.2	3.9	4.3	4.2	4.7	30.2
Gross job turnover[9]	36.9	38.3	39.2	38.5	36.5	36.6	33.4	36.3	125.4
Gross job gain[10]	21.4	22.0	21.0	15.8	20.2	21.2	18.9	20.0	76.0
Gross job loss[11]	15.4	16.3	18.1	22.7	16.3	15.5	4.5	16.7	49.4

NOTES See Table C-1.
SOURCE Special tabulations provided by Statistics Canada.

Table C-3

Source of Firm Job Gain and Loss in the Mines, Quarries, and Oil Wells Sector, Canada, 1978-86[1]

	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1978-86
					(Thousands)				
Base-year employment[2]	149.9	170.8	192.0	201.2	182.4	164.7	175.9	179.6	149.9
					(Percentage of base-year employment)				
Net employment change	13.9	12.4	4.8	–9.3	–9.7	6.8	2.1	–5.0	13.8
Continuing firms (net)[3]	12.9	11.6	4.7	–9.2	–9.1	6.1	4.4	–4.9	7.9
Expanding[4]	17.0	16.1	12.2	6.3	5.1	12.6	11.7	7.1	32.2
Contracting[5]	4.1	4.5	7.5	15.6	14.1	6.6	7.4	12.0	24.3
Entry and exit (net)[6]	1.1	0.8	0.1	–0.1	–0.6	0.7	–2.3	–0.2	5.9
Entry[7]	2.6	1.6	1.1	1.2	1.2	2.4	1.6	1.2	20.3
Exit[8]	1.5	0.8	1.0	1.3	1.9	1.7	3.8	1.3	14.4
Gross job turnover[9]	25.2	23.0	21.8	24.4	22.3	23.3	24.5	21.6	91.2
Gross job gain[10]	19.6	17.7	13.3	7.5	6.3	15.0	13.3	8.3	52.5
Gross job loss[11]	5.6	5.3	8.5	16.9	16.0	8.3	11.2	13.3	38.7

NOTES See Table C-1.
SOURCE Special tabulations provided by Statistics Canada.

Table C-4

Source of Firm Job Gain and Loss in the Manufacturing Sector, Canada, 1978-86[1]

	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1978-86
					(Thousands)				
Base-year employment[2]	2,067.3	2,143.6	2,176.3	2,182.9	2,001.2	1,866.4	1,979.8	2,026.3	2,067.3
					(Percentage of base-year employment)				
Net employment change	3.7	1.5	0.3	–8.3	–6.7	6.1	2.4	1.8	–0.2
Continuing firms (net)[3]	3.9	1.7	0.8	–7.9	–6.1	6.4	2.4	2.2	1.8
Expanding[4]	9.5	8.3	6.6	3.8	5.0	11.1	8.1	8.4	18.1
Contracting[5]	5.6	6.6	5.8	11.7	11.1	4.7	5.7	6.1	16.3
Entry and exit (net)[6]	–0.2	–0.1	[illegible]	–0.4	–0.6	–0.3	0.0	–0.5	–2.0
Entry[7]	1.6	1.2	1.0	0.8	1.1	1.9	1.6	1.2	13.9
Exit[8]	1.8	1.3	1.5	1.2	1.7	2.2	1.6	1.7	15.9
Gross job turnover[9]	18.5	17.5	14.8	17.5	18.8	20.0	17.0	17.4	64.1
Gross job gain[10]	11.1	9.5	7.6	4.6	6.0	13.1	9.7	9.6	31.9
Gross job loss[11]	7.4	8.0	7.3	12.9	12.8	7.0	7.3	7.8	32.2

NOTES See Table C-1.
SOURCE Special tabulations provided by Statistics Canada.

Table C-5

Source of Firm Job Gain and Loss in the Construction Sector, Canada, 1978-86[1]

	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1978-86
					(Thousands)				
Base-year employment[2]	445.8	454.2	449.1	471.5	421.4	404.3	413.4	444.9	445.8
					(Percentage of base-year employment)				
Net employment change	1.9	–1.1	5.0	–10.6	–4.1	2.3	7.6	8.7	8.5
Continuing firms (net)[3]	0.9	–1.3	4.2	–9.8	–4.1	2.1	6.6	7.4	3.7
Expanding[4]	15.6	14.0	17.7	10.7	16.0	18.5	19.8	20.1	23.9
Contracting[5]	14.7	15.3	13.5	20.5	20.1	16.4	13.3	12.7	20.2
Entry and exit (net)[6]	1.0	0.2	0.7	–0.8	0.0	0.1	1.0	1.3	4.8
Entry[7]	4.8	3.8	4.2	2.9	4.3	4.5	5.0	4.7	40.7
Exit[8]	3.8	3.6	3.4	3.7	4.3	4.4	4.0	3.5	35.9
Gross job turnover[9]	38.9	36.8	38.8	37.8	44.7	43.8	42.1	41.0	120.7
Gross job gain[10]	20.4	17.8	21.9	13.6	20.3	23.1	24.8	24.9	64.6
Gross job loss[11]	18.5	19.0	16.9	24.2	24.4	20.8	17.2	16.2	56.1

NOTES See Table C-1.
SOURCE Special tabulations provided by Statistics Canada.

Table C-6

Source of Firm Job Gain and Loss in the Transportation, Communications, and Other Utilities Sector, Canada, 1978-86[1]

	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1978-86
(Thousands)									
Base-year employment[2]	863.8	850.4	817.3	839.6	807.6	754.7	772.5	781.7	863.8
(Percentage of base-year employment)									
Net employment change	–1.6	–3.9	2.7	–3.8	–6.6	2.4	1.2	0.0	–9.5
Continuing firms (net)[3]	–1.6	–4.0	3.2	–3.6	–6.3	2.3	1.5	0.3	–10.9
Expanding[4]	5.2	4.3	7.7	3.6	2.9	6.1	6.2	6.3	11.8
Contracting[5]	6.9	8.4	4.5	7.2	9.2	3.8	4.7	5.9	22.7
Entry and exit (net)[6]	0.1	0.2	–0.4	–0.2	–0.3	0.1	–0.3	–0.3	1.4
Entry[7]	0.9	1.1	0.8	0.9	0.8	1.1	1.0	1.1	9.7
Exit[8]	0.8	0.9	1.3	1.1	1.1	1.1	1.3	1.4	8.4
Gross job turnover[9]	13.8	14.7	14.3	12.8	13.9	12.2	13.3	14.7	52.5
Gross job gain[10]	6.1	5.4	8.5	4.5	3.7	7.3	7.2	7.4	21.5
Gross job loss[11]	7.7	9.3	5.8	8.3	10.3	4.9	6.0	7.4	31.0

NOTES See Table C-1.
SOURCE Special tabulations provided by Statistics Canada.

Table C-7

Source of Firm Job Gain and Loss in the Wholesale Trade Sector, Canada, 1978-86[1]

	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1978-86
(Thousands)									
Base-year employment[2]	506.7	530.6	542.3	551.0	520.0	495.6	533.4	563.7	506.7
(Percentage of base-year employment)									
Net employment change	4.7	2.2	1.6	–5.6	–4.7	7.6	5.7	1.8	13.2
Continuing firms (net)[3]	4.9	2.3	1.7	–5.0	–4.2	8.2	5.5	2.8	12.8
Expanding[4]	11.4	9.8	9.7	7.5	8.4	15.4	12.4	11.1	28.3
Contracting[5]	6.5	7.6	7.9	12.6	12.6	7.2	6.9	8.3	15.5
Entry and exit (net)[6]	–0.1	–0.1	–0.1	–0.6	–0.5	–0.6	0.2	–1.0	0.4
Entry[7]	2.7	2.3	2.4	2.1	2.4	2.7	2.6	1.8	27.5
Exit[8]	2.8	2.4	2.5	2.7	2.9	3.3	2.4	2.8	27.1
Gross job turnover[9]	23.4	22.1	22.6	24.8	26.2	28.7	24.3	24.0	98.4
Gross job gain[10]	14.1	12.2	12.1	9.6	10.8	18.1	15.0	12.9	55.8
Gross job loss[11]	9.3	10.0	10.5	15.2	15.5	10.5	9.3	11.1	42.6

NOTES See Table C-1.
SOURCE Special tabulations provided by Statistics Canada.

Table C-8

Source of Firm Job Gain and Loss in the Retail Trade Sector, Canada, 1978-86[1]

	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1978-86
					(Thousands)				
Base-year employment[2]	1,080.4	1,195.1	1,238.4	1,276.5	1,248.8	1,220.7	1,293.2	1,364.1	1,080.4
					(Percentage of base-year employment)				
Net employment change	10.6	3.6	3.1	–2.2	–2.3	5.9	5.5	4.1	31.4
Continuing firms (net)[3]	10.3	3.3	2.8	–1.7	–2.1	5.5	4.4	3.9	20.8
Expanding[4]	15.3	9.0	8.7	7.3	7.0	11.3	11.0	10.9	33.6
Contracting[5]	5.0	5.7	5.9	9.1	9.1	5.8	6.6	7.0	12.8
Entry and exit (net)[6]	0.3	0.4	0.3	–0.4	–0.2	0.4	1.1	0.2	10.6
Entry[7]	2.9	2.6	2.6	1.9	2.3	2.7	3.4	2.8	32.8
Exit[8]	2.6	2.2	2.3	2.4	2.4	2.3	2.3	2.6	22.2
Gross job turnover[9]	25.8	19.6	19.5	20.7	20.7	22.1	23.5	23.3	101.4
Gross job gain[10]	18.2	11.6	11.3	9.3	9.2	14.0	14.5	13.7	66.4
Gross job loss[11]	7.6	8.0	8.2	11.4	11.5	8.1	9.0	9.6	35.0

NOTES See Table C-1.
SOURCE Special tabulations provided by Statistics Canada.

Table C-9

Source of Firm Job Gain and Loss in the Finance, Insurance, and Real Estate Sector, Canada, 1978-86[1]

	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1978-86
					(Thousands)				
Base-year employment[2]	560.9	592.5	617.9	613.6	614.0	610.4	612.6	648.8	560.94
					(Percentage of base-year employment)				
Net employment change	5.6	4.3	–0.7	0.1	–0.6	0.4	5.9	5.2	21.7
Continuing firms (net)[3]	5.4	3.9	–0.5	–0.3	–0.3	0.3	5.8	4.6	16.7
Expanding[4]	10.1	8.9	6.7	8.0	7.7	6.3	11.2	10.8	28.6
Contracting[5]	4.7	5.0	7.2	8.3	8.0	6.0	5.5	6.3	11.9
Entry and exit (net)[6]	0.2	0.4	–0.1	0.3	–0.3	0.1	0.1	0.6	5.0
Entry[7]	1.7	1.8	1.8	1.8	1.8	2.2	2.5	2.1	18.8
Exit[8]	1.4	1.4	1.9	1.4	2.1	2.1	2.3	1.5	13.8
Gross job turnover[9]	17.9	17.1	17.6	19.5	19.6	16.6	21.5	20.6	73.1
Gross job gain[10]	11.8	10.7	8.5	9.8	9.5	8.5	13.7	12.9	47.4
Gross job loss[11]	6.1	6.4	9.1	9.7	10.1	8.1	7.8	7.7	25.7

NOTES See Table C-1.
SOURCE Special tabulations provided by Statistics Canada.

Table C-10

Source of Firm Job Gain and Loss in the Community, Business, and Personal Services Sector, Canada, 1978-86[1]

	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1978-86
(Thousands)									
Base-year employment[2]	2,515.6	2,646.0	2,796.7	2,911.0	2,942.1	2,922.1	3,107.6	3,230.5	2,515.6
(Percentage of base-year employment)									
Net employment change	5.2	5.7	4.1	1.1	–0.7	6.3	4.0	5.0	34.8
Continuing firms (net)[3]	4.2	4.8	3.2	0.6	–1.0	5.7	2.7	4.7	18.5
Expanding[4]	9.3	9.9	8.7	7.6	7.3	10.3	8.5	10.1	27.8
Contracting[5]	5.0	5.0	5.5	7.0	8.3	4.6	5.8	5.4	9.3
Entry and exit (net)[6]	0.9	0.8	0.9	0.5	0.4	0.7	1.2	0.3	16.3
Entry[7]	3.0	3.0	2.9	2.7	2.5	3.2	3.3	2.9	33.2
Exit[8]	2.0	2.1	2.0	2.2	2.1	2.5	2.1	2.5	16.8
Gross job turnover[9]	19.3	20.0	19.2	19.5	20.2	20.7	19.7	21.0	87.1
Gross job gain[10]	12.2	12.8	11.7	10.3	9.8	13.5	11.8	13.0	61.0
Gross job loss[11]	7.1	7.1	7.6	9.2	10.5	7.2	7.9	8.0	26.1

NOTES See Table C-1.
SOURCE Special tabulations provided by Statistics Canada.

D Note on the Methodology Used to Calculate Worker Turnover

This appendix describes the methodology used to generate the worker turnover data presented and discussed in Chapter 6. The discussion is divided into four parts. First, the source of the number and type of worker separations – the Record of Employment (ROE) – is examined. The second section discusses the source of employment data by which the number of separations were divided to obtain the separation rates reported in the text. Individual tax records were used to generate the number of jobs and the number of people who held jobs. The third section discusses particular problems that arose. The fourth section contains several validation checks.

Record of Employment: Reason for Separating

In order to estimate data on labour turnover, information on the frequency with which individuals separate from their employer is required. The data for separations come from the administrative records of the unemployment insurance (UI) program. These are collected and tabulated by the Canada Employment and Immigration Commission in conjunction with the UI program.

Each time a worker has an "interruption of earnings" when in insurable employment a record of employment must by law be issued. The ROE is completed by the employer and is used to determine whether the employee is eligible for UI benefits. An interruption of earnings is defined by the following two conditions:

> 1) Following a period of employment there is a lay-off or separation from that employment and a period of seven consecutive days when an employee performs no work and has no earnings from the employer (remuneration for a statutory holiday immediately after the last day worked and old age, military and employment pensions are not considered as earnings for the purpose of determining if there is an interruption of earnings).
>
> 2) When insured persons stop working because of illness, injury, quarantine, pregnancy or adoption and their weekly earnings (for example paid sick leave) fall below 60 per cent of the normal weekly insurable earnings from that employment. (Wage-loss indemnity payments, whether insurable or not, are not considered earnings for the purpose of determining if there is an interruption of earnings.) (Canada, Department of Employment and Immigration, 1986, p. 6.)

Because only interruptions of insurable employment require the issuance of an ROE, not all separations will be covered by data derived from ROEs. As of 1989, the requirement was that the worker earn at least $121 per week or work at least 15 hours. While the meaning of an interruption is reasonably clear for full-time workers, this is not the case for other workers. Part-time, irregular, and temporary workers receive an ROE if the "employee is no longer on the employer's supply list; the employee did not work for a period of 30 days; . . . or it is requested by the employee and an interruption of earnings occurred in the last 52 weeks or since the last ROE was issued, whichever is later" (ibid., p. 11). Coverage of irregular jobs is probably less complete than of full-time jobs.

When these conditions are met, the ROE is supposed to be issued within five calendar days of the interruption of employment. An individual may have more than one ROE per year if he is employed, unemployed, re-employed, and subsequently unemployed again.

In completing an ROE, the employer must complete a section entitled reason for issuing the record. There are 10 different codes. They are defined for the employer as follows:

> *Code A (shortage of work)* – The interruption of earnings may be caused by, for example, a plant shutdown, decreased production, bad weather, fire hazard or job completed.
>
> *Code B (strike or lockout)* – The interruption of earnings is caused by a strike or lockout at the place of work.
>
> *Code C (return to school)* – The employee has left the job to go to school or university.
>
> *Code D (illness or injury)* – The interruption of earnings is caused by illness, injury or quarantine.
>
> *Code E (quit)* – The employee voluntarily left the job. If you know the reason, give this information in the space provided for comments.

> *Code F* (pregnancy) – The interruption of earnings is caused by pregnancy.
>
> *Code G (retired)* – Use this code only if the employee has retired before reaching age 65. Give the reason for retirement such as voluntary, health reasons or company policy. If the employee has reached age 65, use Code K ("other") and write "age 65" in the space provided for comments.
>
> *Code H (worksharing)* – If your company negotiated a worksharing agreement with the Commission and this employee is covered by that agreement, use this code.
>
> *Code J (apprentice training)* – Under provincial legislation, some apprentices must take training as a condition of their apprenticeship. Use this code when you are issuing an ROE for such an apprentice.
>
> *Code K (other)* – If the ROE is being issued because the employee has reached age 65 or for some other reason which is not covered by a code on the form enter "K" in the box to the right. In the space provided for comments below enter the reason. For example, "age 65," "adoption leave," "leave of absence" or "requested by the Commission." If the employee has been fired, just enter "fired." The Commission will ask you later for more details (ibid., p. 17).

Code K (other reason) includes fixed-term contracts/projects, casual labour, discharges, and business closures. The division of separations between these various categories is done by the employer. Since the category into which a worker falls determines in some instances the benefits to be paid, some categories may be underreported and others overreported. In particular, since a penalty exists for quits because the employee has to wait longer for the start of the UI payments, this category may be underrepresented in the data.

It is difficult to verify whether this is the case for two reasons. First, the definition of what should fall in the quit category is not precise – especially when a separation falls in more than one classification, but the employer is only allowed to select one code. Secondly, there is not much quantitative data that allow cross-checks on the validity of the ROE data. What little exists suggests that the amount of bias is not large enough to affect the points being made in Chapter 6. Roller (1989) compares the 1986 reasons for separating derived from the Labour Market Activity Survey (LMAS) of workers and finds a close correspondence – even though there are some problems in matching categories. Quits account for 24 per cent of ROEs and 28 per cent of LMAS reasons for separating. Whether this indicates underreporting of quits in the ROE database is difficult to ascertain because of differences in definitions and coverage. But they are close enough for the purposes at hand.

In the analysis in the main text of the report, the ROE are usually divided into three categories. These are: shortage of work (code A); quit (code E); and other reason (codes B, C, D, F, G, H, J, K).

In the text, the shortage of work category (A) is referred to as a layoff. In some cases the aggregate "other" category is broken down (e.g., Tables 6-2 and 6-4).

In considering the dynamics of the labour market, those who receive an ROE for code A are divided into two categories. Those who return to the same employer within two years of the date of separation are called return or temporary layoffs. Those who do not return to the same employer within two years but find employment within that period are called nonreturn or permanent layoffs.[1] The two-year period was selected by Robertson (1987*a*, p. 22, note 4) because:

> . . . two-years of joblessness is a realistic indicator of labour force withdrawal. The two year cut-off point was employed because after that period of time most persons [who are] jobless have in fact withdrawn from the labour force. For older workers (55+) one in five withdraw (retire) while 10 percent of females and about 5 percent of males leave the labour force.

Whether or not a worker returns to the same employer is ascertained by searching across the employer tax returns and ROEs one and two years in the future to see if the employer identifier number matches that on the ROE of interest.

The Labour Force: Statement of Remuneration Paid (T4s)

In evaluating the turnover process, a base is needed with which to compare the separation data. Employment provides one such base. There are several potential candidates for this purpose. These include employment from the Labour Force Survey, persons covered by unemployment insurance, and all persons for whom at least one T4s is filed. Table D-1 presents estimates of total employment using these three sources. Robertson (1987*a*, p. 24, note 5) explains the differences between the three sources as follows:

> Employment is highest for administrative data, since they include all those individuals who had any employ-

Table D-1

Aggregate Employment in the Economy, Based on Three Data Sources, Canada, 1974-83[1]

	Administrative employment level (1)	Labour Force Survey: Persons employed at some time during the year (2)	Labour Force Survey: Average monthly employment level (3)	Persons covered by unemployment insurance (4)
	(Thousands)			
1974	10,429	..	9,125	9,962
1975	10,680	..	9,284	10,177
1976	10,917	..	9,477	10,279
1977	11,121	11,528	9,651	10,393
1978	11,358	12,011	9,987	10,567
1979	11,705	12,431	10,395	10,786
1980	11,999	12,736	10,708	10,954
1981	12,380	..	11,006	11,442
1982	12,152	12,854	10,644	11,181
1983	12,201	13,081	10,734	11,229

[1] The level of employment based on administrative data (column 1) is the number of individuals who had at least one T4s (Revenue Canada, Statement of Remuneration Paid) during the year. Persons employed at some time during the year (column 2) is taken from the Annual Work Patterns Survey. The Labour Force Survey definition of employed persons (column 3) is "all persons who, during the reference week: a) did any work at all; b) had a job but were not at work due to own illness or disability, personal or family responsibilities, bad weather, labour dispute, vacation, other reason not specified above (excludes persons on layoff and persons whose job attachment was to a job to start at a definite date in the future)" (Statistics Canada, 1983*b*, pp. 153-4). In contrast to the administrative data, it includes the self-employed. Persons covered by unemployment insurance (column 4) include all individuals for whom there exists an employer-employee relationship, excepting those who are 65 and over, those who earn less than 20 per cent of the maximum weekly insurable earnings, or those who work fewer than 15 hours per week (currently).

SOURCE Data supplied by Employment and Immigration Canada for columns 1 and 4; Statistics Canada (1982*b*) and various issues of the *The Labour Force*, Cat. No. 71-001, for column 2; and Statistics Canada (1984*a*), p. 66, for column 3.

> ment earnings during the year. The Labour Force Survey data [Table D-1, column 3], on the other hand, misses those individuals who had short employment spells between the monthly Labour Force Survey dates. Those covered by UI (insured employment) is lower than the T4s based data, since those in non-insurable employment are excluded (including workers over 65 and those who work less than 15 hours per week).

Two measures of employment from the Labour Force Survey are presented in Table D-1. The most commonly used measure (column 3) is based on the monthly survey that captures data on those who are employed and unemployed as of a given date. It does not, when monthly averages are taken over a year, give a very accurate reflection of the number of workers who held a job in any year since some who are unemployed in one month will have taken up jobs in a subsequent month and vice versa. The Annual Work Patterns Survey (AWPS) does provide an employment concept that is closer to the administrative one – the number of persons employed at some time during the year (column 2; see Statistics Canada, 1982*b*, for details).

Employment from the monthly Labour Force Survey (column 3) is considerably below the number of people for whom a T4s was filed, which is taken from administrative records. The number of persons employed at some time during the year as given by the AWPS (column 2) is slightly larger than the number given by taxation data (column 1). There are a number of reasons to expect a difference. First, the AWPS excludes the Yukon and the Northwest Territories. In contrast, the administrative taxation records include such workers as well as workers who are abroad but for whom Canadian companies file tax records. Second, the AWPS includes the self-employed whereas the T4s records do not.

Manufacturing employment from the Census of Manufactures, the monthly Labour Force Survey, and administrative data are presented in Table D-2. In the administrative data, individuals are classified to manufacturing if this sector accounted for the greatest percentage of their earnings. There is no comparable information from the AWPS on the number of people who held a job at some time during the year in manufactur-

Table D-2

Employment Levels in the Manufacturing Sector from Various Sources, Canada, 1974-82

	Total employment in manufacturing		
	Census of Manufactures[1] (1)	Labour Force Survey[2] (2)	Administrative level data[3] (3)
1974	1,785,977	1,978,000	2,425,231
1975	1,741,159	1,871,000	2,383,949
1976	1,743,047	1,921,000	2,363,398
1977	1,704,583	1,888,000	2,302,024
1978	1,790,618	1,956,000	2,370,738
1979	1,855,393	2,071,000	2,429,992
1980	1,850,436	2,111,000	2,449,411
1981	1,853,968	2,122,000	2,524,650
1982	1,709,418	1,930,000	2,337,816

1 Full-time equivalent, total activity.
2 See note to Table D-1 for definition used in Labour Force Survey.
3 Number of individuals who had at least one T4s (Revenue Canada, Statement of Remuneration Paid). A person may work in several sectors including manufacturing. An individual is classified to that sector accounting for the greatest percentage of his/her earnings.

SOURCE Statistics Canada (1984*a*), p. 130, and (1986), Table 1, p. 2; and data supplied by Employment and Immigration Canada.

ing. Once again, the administrative data (column 3) provide a higher figure than the average monthly employment concept used in the census.

None of the candidates discussed above is obviously superior and the choice of the base against which separations should be measured is arbitrary. But there is merit in using the number of people who had jobs for both conceptual and practical reasons. For conceptual reasons, it is desirable to measure separations relative to the number of people with jobs rather than some measure of average employment since it is ultimately the fate of workers in which we are interested and the number of people with jobs provides a direct measure of the number involved. For consistency and comprehensiveness, the administrative count of the number of people on the T4s records is, therefore, used here to define employment. It is more comprehensive than the AWPS count which does not exist for all years. It is more comparable as well since it does not include the self-employed (as does the AWPS) and members of this group are not issued an ROE upon separation.

It should be noted that there are other candidates that could have been used. The total number of jobs could be used – the number of times an individual is covered by different employers' T4s filings.[2] This will differ from the number of people covered by a T4s filing since some individuals will be multiple job holders – either because of part-time work or because of a change in employers. This is investigated below.

Data Sources

Two data sources were utilized herein. Separation rates have been calculated by Matthew Robertson (1987*a*, 1987*b*) of Strategic Policy and Planning, Employment and Immigration Canada, for the period from 1974 to 1982.[3] More recently, new files have been constructed at Statistics Canada for the period from 1978 to 1984 using the same basic sources – the ROE and T4s files – under the aegis of Garnett Picot of the Business and Labour Market Analysis Group. The latter permit some improvements to be made to the series published by Robertson (1987*b*).[4]

The Robertson data have the advantage that they extend back to the early 1970s, whereas the Statistics Canada data only begin in late 1978. The Statistics Canada file has the advantage that it uses firm-level identifiers originally created for the LEAP database (see Appendix B) whereas the Robertson data use a lower firm-level identifier.

The worker turnover data generated by Robertson use firm identifiers that correspond neither to the establishment nor to the firm definitions that were analysed to generate job-gain and job-loss rates in this study. These definitions were discussed in Appendices B and C. An employer for the Robertson database is anyone who files an ROE that is submitted to the Canada Employment and Immigration Commission. As indicated, each employer is assigned a payroll deduction account number (a PAYDAC or PD number). In some instances, the employer may submit data for *all* of his employees, only for groups of establishments, or even for individual establishments. Therefore, a reporting unit (a PD account) may or may not correspond to the firm or establishment concept used for the data presented in Chapter 3. The LEAP file, whose job-generation statistics were quoted in Chapter 4, uses a more aggregated definition of the firm in that PAYDAC numbers are aggregated to the Statistics Canada BRID concept of a firm. The latter is essentially a corporate legal entity.

The latter firm-level identifiers are superior to the PD codes used by Robertson. When PD accounts are used, workers may apparently shift firms because PD accounts used by the same firm sometimes shift. The Statistics Canada data use firm-level identifiers that are less subject to such changes. Moreover, since these identifiers also have been developed for longitudinal studies, much of the change in these codes that result from corporate reorganizations has also been removed. The Statistics Canada data are also potentially superior when it comes to industry codes.

In order not to lose the information from the early 1970s that is contained in Robertson, his results are compared to those obtained from the Statistics Canada file for the overlapping period from 1978 to 1982 and the differences used to modify the data for the earlier period. This gives a usable series from 1974 to 1984.

A comparison of the overlapping series reveals three major improvements in the Statistics Canada data. First, the percentage of total separations in Robertson that are classified as being permanent is too high. This stems from the use of PD numbers to identify firms. Since these numbers can change for administrative reasons when there has been no change in the identity of the employing firm, some worker separations will incorrectly be classified as changing employers and thus be assigned to the permanent-separation category. Table D-3 compares the permanent-separation rate for the two databases for the period 1978-82. The differences across all categories are quite constant and the average difference has been used to modify the PD-based data and to produce Table 6-4, which gives the percentage of total separations that are temporary.

The rates reported by Robertson are modified in a second important manner. Not all separations identified by an ROE can be matched to a particular firm. On some, the employer identifier on the ROE does not match that of any of the employers that filed tax records (T4s) for that worker for the same year. Since the identity of the firm from which the separation occurs is missing, it is not possible to determine whether the worker returns to the same firm. Nevertheless, they are genuine separations. They were omitted previously from the Robertson study. Since these are genuine separations, they are added here into each category. They are split into temporary and permanent by category in the same proportion as are the separations for whom the employer can be determined. When separation rates are calculated at the industry level, the unmatched ROEs are distributed across industries by category in proportion to the matched ROEs.

Finally, the employment data reported by Robertson and used to calculate the rates of separation had to be corrected. The previous estimate was too high – probably because it either used an estimate of all jobs in the economy as opposed to people who had jobs, or because it included those individuals who received T4s from unemployment in the employment count.

Table D-3

Annual Comparison of the Effect of Using PD rather than BRID Firm Identifiers in Calculating the Proportion of Total Separations that Were Temporary, Canada, 1978-82

	Separation category									
	Layoffs		Quits		Miscellaneous[3]		Other[4]		Total	
	PD[1]	BRID[2]	PD	BRID	PD	BRID	PD	BRID	PD	BRID
	(Per cent)									
1978	50	54	16	18	54	61	34	39	39	43
1979	51	55	15	19	51	57	34	38	37	42
1981	56	60	15	17	54	59	34	36	41	43
1982	59	64	15	19	66	71	40	46	50	54
Mean	54.0	58.3	15.3	18.3	56.3	62.0	35.5	39.8	41.8	45.5

1 The PD-based data come from Robertson (1987*b*).
2 The BRID-based data were developed under the aegis of Garnett Picot, Business and Labour Market Analysis Group, Statistics Canada.
3 Codes D, F, and G on the ROE.
4 Codes B, C, H, J, and K on the ROE.
SOURCE Special tabulations, Business and Labour Market Analysis Group, Statistics Canada.

Validation Checks

Separation rates in Chapter 6 are defined in terms of the number of people who received an ROE but did not return to the same employer after separation. It is important to examine the possible inaccuracies yielded by this approach and the particular data that are being employed. It may be, for instance, that there is an undercount if employers do not file an ROE whenever an employee separates. Until recently, the extent to which this is the case has been difficult to evaluate. But the 1986 Labour Market Activity Survey provides an estimate of 6,302,000 separations. There were 6,213,000 ROEs filed in that year. The differences are less than 2 per cent (Roller, 1989).

It may still be that ROE data on separations provide a distorted picture of the displacement process. There are two reasons for this. First, as previously noted, some ROEs cannot be linked to an employer via tax records in the same year. The permanent versus temporary split for this group is taken from those ROEs that can be matched. The unmatched group may, however, not be typical of the population and this will mean that the estimated permanent-separation rate will be incorrect. Second, the choice of an ROE-based separation rate mixes separations from different types of jobs. Some jobs are secondary to a main job, other jobs are part-time. If the separation rates for these jobs are different from those for major jobs, then mixing the two together may create an average that is not representative of either.

In order to investigate this phenomenon, separation rates were estimated in an entirely different fashion. Instead of starting with an ROE and searching to see whether a separated worker returns to the same em-

Table D-4

Annual Separation Rates Calculated by Comparing Employer Firm Identifier in Consecutive Years, Canada, 1978-84

		Separation rate			Permanent-separation rate using ROE data
	Jobs (1)	Total (2)	Temporary (3)	Permanent[1] (4)	(5)
				(Per cent)	
Panel A: major jobs[2]					
1978	10,836	36.4	13.9	22.5	25.9
1979	11,340	36.0	14.1	21.9	26.7
1980	11,746	37.4	15.2	22.2	25.3
1981	12,153	38.4	16.4	22.0	27.6
1982	11,640	42.2	22.2	20.0	22.9
1983	11,559	36.9	16.7	20.2	21.1
1984	11,810	37.9	17.9	20.0	24.3
Panel B: secondary jobs[2]					
1978	6,154	68.6	19.2	49.4	...
1979	6,272	70.2	17.5	52.7	...
1980	6,163	69.3	15.4	53.9	...
1981	6,367	72.7	15.1	57.6	...
1982	5,234	71.3	19.2	52.1	...
1983	5,279	70.3	17.4	52.9	...
1984	5,595	71.6	18.6	53.0	...

1 A permanent separation is a worker who is not issued a T4s by the same employer for two consecutive years.

2 Major jobs were defined as that T4s with the highest earnings. If a job paid less than the UI benefits received by a worker while unemployed, that job was classified as secondary.

SOURCE Special tabulations, Business and Labour Market Analysis Group, Statistics Canada; and Table 6-3.

ployer, workers' tax records were compared across years and a permanent separation was defined to occur when the worker could not be found with the same employer in both of the subsequent two years. This potentially overcomes the problems of missing ROEs or unmatched ROEs. For this exercise, jobs were divided into major and secondary. Major jobs were those that accounted for more earnings than any other. Secondary jobs of an individual were the remainder.

The results of this exercise are reported in Table D-4 for the entire Canadian economy for the years 1978-84. Panel A covers major jobs; Panel B covers secondary jobs. The permanent-separation rate is given in column 4. The total number of jobs in each category in each year are also included (column 1).

In order to estimate total separations, the number of temporary separations are also required. Therefore, ROE records were matched to the workers tax records and the total number of temporary separations were counted from this source. An estimate of temporary separations is presented in column 3. Since unmatched ROE records could not be used, the temporary-separation rate will be slightly low compared to estimates presented in Chapter 6 which include the unmatched category. The total separation rate is just the sum of the temporary and permanent rates (column 2).

It is evident that secondary jobs have a much higher total separation rate and also a higher permanent-separation rate than primary or major jobs. One in two secondary jobs results in a permanent separation. Only about one in five major jobs results in a permanent separation. By way of contrast, the chances of temporary separation are almost the same. Over the period from 1978 to 1984, the temporary-separation rate for major jobs averaged 16.6 per cent per year; for secondary jobs, it was 17.5 per cent. The higher total rate for secondary jobs then stems from the higher permanent-separation rate that these jobs experience.

These data indicate that mixing the results from primary and secondary job separations may yield misleading statistics. Nevertheless, the permanent-separation rate calculated for primary jobs is 21.3 per cent for the 1978-84 period. This is only slightly below the figure of 24.8 per cent obtained from directly counting all permanent separations from the ROE data and using as denominator the number of people who had a job during the period as evidenced by either a T4s record or an ROE record.

E Databases Used to Measure Worker Mobility

The studies reported in Chapter 7 use at least two, and often three, administrative databases. The first contains the Statement of Remuneration Paid (T4s) that all employers file annually on behalf of their employees. This was used to construct the LEAP file (see Appendix C). The second is the Record of Employment (ROE) file that contains data on worker separations (see Appendix D). The third is the unemployment insurance (UI) benefits file.

These three files have been combined into a longitudinal file by the Canada Employment and Immigration Commission and used for labour research primarily related to the administration of the UI program. The T4s file provides information on the worker while employed; the ROE file, on the reason for, and date of, a separation; and the UI file, on the use of unemployment insurance and the occupation of the worker.

The studies that have been generated by these databases must be interpreted carefully. There are two reasons for this. First, definitions and usage may differ between these and other sources. Second, the strengths and weaknesses of the data must be appreciated.

Since the T4s file and the ROE file have already been discussed in Appendices C and D, respectively, only additional issues relevant to the estimation of mobility will be discussed herein. The first point to note is that the firm concept used on these files corresponds to an employer payroll account number (a PD number). Movement of workers from one payroll account to another within the same firm will be counted as employer change. The frequency of this type of "false" move has not been evaluated. Any effect will be greatest in an estimation of whether the worker has changed employers. It may also influence estimates of interindustry mobility; but the magnitude of error is probably smaller because the PD accounts of the same employer tend to have the same Standard Industrial Classification code.

The second problem with the administrative files is that the assignment of a firm (a PD account) to an industry is not done with quite the same precision as occurs within Statistics Canada. This may affect the estimates of interindustry mobility. However, any errors here are probably small. In the text, survey evidence of displaced workers who lost their jobs between 1981 and 1984 (Picot and Wannell, 1987) is used to confirm that interindustry mobility is high. Additional evidence provided by C. Kapsalis originating from the 1986 Labour Market Activity Survey that covered individuals who experienced unemployment or a change in jobs during that year also shows the same type of interindustry pattern that is reported in Picot and Wannell.

The third problem with the administrative files lies with the occupational codes contained thereon and, therefore, with the associated estimates of occupational mobility. Occupational data from administrative records suffer the same problems as the census data that were used in Chapter 2. Since occupations are sometimes unique to an industry, some of the occupational mobility described may just reflect interindustry mobility. Any occupational mobility study may also have problems with the accuracy of occupational coding. Turner (1983) examined the degree to which occupational coding for the same set of people can differ in two separate surveys and found high rates of error. A survey that asks a worker for his/her own job experience may not yield upward biased mobility rates, but the use of codes that have been applied by different surveys at different times may yield error rates of upward of 20 per cent.

This is a potential problem with the administrative data because of the way in which the occupational codes are applied by the UI administrators when a worker reports for UI benefits. The codes are meant to reflect the current occupation of the worker – defined as the occupation in which the worker might most reasonably be expected to find his/her next job. These data may be criticized as not being subject to the same degree of accuracy that a statistical agency might apply to a census or a survey. We, therefore, cross-checked the mobility tables that were used in the text against survey evidence (see Table E-1). We report the percentage of workers in each occupation that stayed in the same occupation. The proportion that did not is an indicator of mobility. In columns 2 and 3, a survey of workers displaced between 1981 and 1984 is used to generate mobility rates comparable to those reported in the text, which are reproduced in column 1. Column 2 uses the sample of displaced workers who subsequently found a job. Column 3 uses just the subset of these workers who had at least a three-year tenure upon separation. Occupational mobility from the 1986 Labour Market Activity Survey is presented in column 4. This survey covers workers who experienced unemployment or a change in jobs during the year. At the level being used here, the survey sources show substantial occupational mobility – as did the administrative data.

The strengths of the longitudinal file lie in its ability to enumerate events – work, separation, insurance period, work again. It is ideally suited for following these statuses over time. It is less suited for dating precisely all transitions from one status to another. The dates of separation, of unemployment claim, and of exhaustion of benefits are reasonably precise – though, even here, there are considerable gaps in information. But return-to-work dates must either be obtained from a subsequent ROE (which contains a field for date of first week worked) or inferred from a subsequent T4s, which does not contain a field entitled "first week worked." For jobs with a long duration, this dating procedure is inaccurate. It is known, for instance, that the longitudinal file has the number of new jobs peaking in January and not in the middle of the summer as actually occurs. This is because a worker with only a T4s record is assumed to start work in January.

Table E-1

A Comparison of Occupational Mobility Estimates, Based on Administrative and Survey Data, Canada, Selected Time Periods

	Proportion of workers who stayed in the same occupation, based on:			
		Survey of Displaced Workers[2]		
	Administrative data[1] (1)	All layoffs (2)	Workers with three-year tenure upon layoff (3)	Labour Market Activity Survey[3] (4)
		(Per cent)		
Occupational group:				
Managerial and administrative	64	46	41	43
Natural sciences and engineering	64	54	58	..
Social sciences, teaching, health, arts	43-61	61	53	..
Natural sciences and social sciences	..	..	..	60
Teaching	..	..	..	52
Clerical	51	55	48	54
Sales	46	44	51	35
Services	48	52	57	51
Primary	39-47	37	41	37
Processing	46	21	20	{ 11
Machining	42	41	47	
Fabricating	45	50	53	40
Construction	54	58	61	58
Transportation equipment operating	40	46	{ 48	44
Material handling	57	18		16

[1] Based on a comparison of occupation in 1978 and 1982 for workers who were unemployed at least twice during the period. Grey (1985), Table 7, p. 18; and *Census of Canada, 1971.*

[2] Based on a 1986 survey of those permanently displaced from their jobs between 1981 and 1984. The data report the percentage of those laid off and who found a new job in the same occupation. Based on Picot and Wannell (1987), Table 12, and data supplied by the authors.

[3] Based on the 1986 Labour Market Activity Survey that covered individuals who experienced unemployment or a change in jobs during the year. The occupational mobility percentages are based on the first two non-overlapping jobs that individuals had in 1986 and was supplied by Constantine Kapsalis of the Canadian Labour Market and Productivity Centre.

The problems in estimating the duration of job search from the administrative files can be evaluated by comparing the estimates of duration derived from administrative data to survey evidence. Administrative data have been used to calculate the average duration of job search for the period 1974-82. Picot and Wannell (1987) provide comparable data derived from the survey of workers displaced in the period 1981-84. The two estimates of jobless duration by age group are compared in Table E-2. Panel A contains the percentage of each of three age groups that fell into the various jobless duration categories according to the administrative data. Panel B does the same for the survey of displaced workers who lost a full-time job and found another full-time job. Even though the periods covered are quite different, the distributions of workers across weeks of search for the 25-54 age class are remarkably similar. The youngest age classes cover different groups and cannot readily be compared. Where the administrative data may err is in the calculation of the relative status of the elderly. The survey data show the proportion in the 55-and-over age class increases as the number of jobless weeks increases – especially when it is calculated relative to the experience of the middle-age class. This is not the case with the administrative data.

The final comparison of administrative results to survey data that is important for the work reported in the text is in the area of wage experience after separation. The problems of administrative data are twofold. If income in a subsequent job is taken from insurable earnings on a subsequent ROE, there may be a truncation bias because of the upper limit on insurable earnings. If it is taken from a T4s, it is difficult to ascertain weeks worked and, therefore, to calculate a weekly earnings figure comparable to that reported on the ROE. The post-layoff experience data, however, can be compared to survey evidence. Picot and Wannell (1987) report data from the displaced worker survey that confirm the points made in the text – that is, workers split more or less equally between those who do better and those who do worse in their next job after separation; older workers are more likely to do worse.

Table E-2

A Comparison of the Duration of Job Search, Based on Administrative and Survey Data, by Age Group, Selected Time Periods, Canada

	Age group		
	17-24	25-54	55 and over
	(Per cent)		
Panel A: Permanent layoffs, based on administrative data, 1974-82:[1]			
Number of jobless weeks			
1-4	18.9	25.3	24.2
5-13	21.4	23.1	23.7
14-26	19.6	17.7	18.7
27-52	26.0	20.7	22.0
53 and over	14.1	13.2	11.4
Total	100.0	100.0	100.0
	Age group		
	20-24	25-54	55 and over
Panel B: Workers who lost a full-time job and found a new full-time job, based on survey data, 1981-84:[2]			
Number of jobless weeks			
0-3	27.3	25.7	...
4-13	31.1	23.0	19.4
14-26	15.6	17.8	23.5
27-52	20.1	22.5	24.0
53 and over	5.9	10.8	...
Total	100.0	100.0	100.0

[1] Excludes persons who had no employment two years after layoff.

[2] See note 1 of Table 7-6 for a discussion of the sample of laid-off workers.

SOURCE Table 7-18 and data supplied by Labour Market Studies Division, Employment and Immigration Canada.

The longitudinal file also does not lend itself to long-term tracking exercises, as yet. A substantial proportion of a work force in any year disappears from these administrative records after a period of five years – because of retirement, emigration, and withdrawal from the labour force for other reasons. The reverse is also true. As a result, samples that compare workers between two points will miss those who were there in the first year but are no longer on administrative records in the last year and vice versa. This can be very substantial – around 20 per cent in several studies (e.g., Allen, 1985). Nonetheless, the data do allow comparisons of the status of those who are consistently employed.

A number of the studies that are reported in Chapter 7 focus on a subsample of workers – those who separate regularly (two or more periods of unemployment insurance over a five-year period). These are individuals who will appear regularly on the ROE and UI files. For various reasons, it is easier to use these records to provide a comprehensive examination of some parts of a work history than to rely only on T4s records. For example, it is relatively easy to compare job earnings by comparing two ROEs; it is more difficult to compare earnings from an ROE and a T4s because of the different earning concepts used. Therefore, it is advantageous to work with a sample of workers where ROEs are prevalent. Such a sample, of course, may not be representative of the population of all workers and conclusions drawn from it may be inappropriate for some purposes. If interest is focused on people who lose their jobs frequently but continue an attachment to the labour force, it is a reasonable sample; if interest is focused on more intermittent separations and people who spend long periods outside the labour force, it is not.

Notes

CHAPTER 1

1 See, for example, Robertson and Grey (1985) and Picot and Lavallée (1986) for studies that decompose output changes by various factors.

2 While it is convenient to refer to layoffs as involuntary and quits and other attritions as voluntary, this does not mean the latter group is not influenced by economic conditions, in particular, by the cyclical fluctuations inherent in the economy. A portion of quits and other separations may result from anticipation of job decline.

3 From Figure 1-2, employment at end of period is $J = E + F + H + B$, while employment at the beginning is $A = B + C + D = B + F + G + H + I$. Therefore job change is $J - A = E - G - I$.

4 Economic Council of Canada (1988*a*, Tables 2 and 6, pp. 22 and 26, respectively). The latter table yields total job gain and total job loss of 626.9 thousand; a net change of 251.3 thousand. Since, from Table 2, the 251.3 thousand represents a 1.8 percentage change, the total reallocation is 4.49 per cent.

5 A firm is sometimes referred to as an enterprise, an employer, a business unit, a consolidated enterprise, or an unconsolidated enterprise depending on the data source – the Census of Manufactures, the LEAP file, and/or the Dun and Bradstreet separation data. Throughout we use the term firm to cover all these terms.

6 Job-loss percentages in other studies are sometimes presented with a negative sign, sometimes not. Since job loss is, by definition, negative we omit the negative sign in this study.

CHAPTER 2

1 $$I(k,t) = 0.5 \sum_{i=1}^{N} |Si,t + k - Si,t|$$

where,

N = the number of industries (or sectors or occupations);
Si = the i^{th} industry's (or sector's or occupation's) share of output (or input);
k = a k-year time period; and
t = the base year.

A sector is a more aggregate level of classification than the industry.

2 In terms of the dissimilarity index defined in note 1, $k = 1$ and t is reset each time.

3 In terms of the dissimilarity index defined in note 1, k will be set equal to some time period several years from the base year.

4 If the rate at which new jobs alone are being created is the focus of interest, then an index that uses shares of net growth in employment, rather than shares of total employment, might be used. Such an index will show much greater change, since dramatic shifts in new job creation are required to affect the overall size distribution when net change is a relatively small percentage of total employment. But it does not show whether the shares of jobs correspond to the original distribution, nor how the original distribution is affected. Moreover, even in the assumption of a closed system, and with all declining shares corresponding to declining industries, it does not indicate how much of the total labour force is being reallocated from declining to growing industries.

5 This does not mean forced change is necessarily eliminated. If entrants to the labour force come with skills in the proportions previously required, a shift in relative demand for inputs, even when all industries are growing at positive rates, will lead to a mismatch between the demand for, and supply of, specific classes of workers.

6 Aggregate employment may remain the same but some firms may have exited and others entered. Even if there was no change in producers, workers may have changed firms or industries, or they may leave and enter the labour force.

7 One can obtain a very different view of the amount of change if output, rather than employment, is used (see Picot, 1986*a*).

8 Picot (1986*a*, p. 101). See Table 2-1 for a definition of the experienced labour force.

9 Here the 44-industry breakdown is reduced to 42.

10 The 12 sectors used by Charette et al. (1986) were agriculture; forestry; fishing and trapping; mines; manufacturing; construction; utilities; transportation, storage, and communications; trade; finance, insurance and real estate; services; and public administration. The cumulative index is calculated from a 1947 base.

11 The 186-industry breakdown used by Charette et al. (1986) corresponds to essentially the L-level in the input-output tables.

12 There was no significant difference in the slope coefficients of the ACI regressed on a time variable.

13 In order to provide a longer time series, two industries (knitting mills and clothing) were combined, so that we have only 19 and not the 20 two-digit manufacturing industries into which the 1970 SIC is divided.

14 Picot (1986*b*, p. 8) suggests that, instead of the variance of the growth rates, the standard error of the ratio of employment in the terminal year to that in the base year be used as a measure of variation in growth rates. For the periods used here, this measure also falls. It is 0.0208, 0.0184, 0.0161, and 0.0167 for each of the four periods for which data is reported in this paragraph.

15 Employment is defined as the experienced labour force. See Table 2-1 for the definition. The data are combined in 42 industries for Table 2-8.

16 More specifically, "The CCDO provides a systematic classification structure to identify and categorize the entire range of occupational activity in the Canadian economy. While "kind of work performed" remains the basic principle for classifying occupations into groups, it has been found necessary to make use of supplementary criteria to clarify the nature of the work. In some instances occupations are grouped according to subject matter; for example, Unit Group 2111, Chemists, and Unit Group 2112, Geologists and Related Occupations. Others are differentiated by the degree of responsibility and complexity of work, e.g., managers, supervisors, foremen, and laborers. Some groups comprise occupations in which the work is complementary in the manner of doctors and nurses in Major Group 31, Occupations in Medicine and Health; in others the functions are related, as in the case of aircraft crews in Unit Group 9111, Air Pilots, Navigators and Flight Engineers.

Other examples of classification criteria are: processes involved (Unit Group 7715, Blasting Occupations, and Unit Group 8135, Metal Rolling Occupations); materials used or produced (Unit Group 8253, Papermaking and Finishing Occupations); equipment used (Unit Group 8315, Machine-Tool Operating Occupations, and Unit Group 9551, Radio and Television Broadcasting Equipment Operators); fabricating, assembling and repairing of similar articles (Unit Group 8561, Shoemaking and Repairing Occupations); and providing similar services (Minor Group 616, Apparel and Furnishings Service Occupations)." See Canada, Department of Manpower and Immigration (1971), p. xiii.

17 For 1961, some 100,000 census returns were recoded to the 1970 SIC and 1971 CCDO occupation classifications.

18 The 1961 data are not perfectly comparable to the 1971 and 1981 definition since the experienced labour force was defined as those employed any time over the 12 months preceding June 1961. The 1971 and 1981 census used 18 months to define experienced labour force. See Foot and Meltz (1985, p. A3).

19 June 1961 is in an expansionary phase, six months after the low point of the 1960 recession; June 1971 is in an expansionary phase, six months after the low point of the 1970 slowdown; June 1981 is at the end of an expansion phase, one year after the low point of the 1980 recession. See Cross (1982).

20 A detailed set of industry tables are available from the authors on request.

21 For 1961-71, the only exceptions are food and beverages and paper; for 1971-81, the exceptions are wood, textiles, knitting mills and clothing, and paper; for 1961-81, the exceptions are leather and knitting mills and clothing.

22 The exceptions are electrical products, food and beverages, and paper.

23 Picot (1986*b*, Table 5, n.p.) also examined occupational share changes using a more detailed (68) occupational breakdown. Disaggregation had little effect on the average proportion of the share change accounted for by a change in industrial structure – 42 per cent for this breakdown.

24 It should be noted that periods do not match exactly.

CHAPTER 3

1 The database for the Baldwin and Gorecki (1983) study was developed by J. McVey, from Statistics Canada, to compare the status of establishments and firms between two endpoints – 1970 and 1979. The firm was defined as all establishments under common ownership at the four-digit SIC level – the unconsolidated firm. Establishments that filed a long form in 1979 but neither a long nor a short form in 1970 were classified as births; the reverse as deaths. Establishments were defined as continuous if they existed in both years and filed a long form in either year. For the definition of long and short forms, and the coverage of the Census of Manufactures, see Statistics Canada (1979). Firms were classified in a similar fashion, based on the status of their establishments. For more details on the methodology, see McVey (1981, especially pp. 71-3).

2 That is, an establishment that existed in 1970 and 1979.

3 That is, an establishment that existed in 1979 but not in 1970. This category includes both establishment openings and establishments that changed or switched their industry classification.

4 That is, an establishment that existed in 1970 and 1979.

5 That is, an establishment that existed in the industry in 1970 but not in 1979. This category includes both establishment closures and establishments that changed or switched their industry classification.

6 Since a firm can be classified in more than one category (i.e., a firm may enter by both building and acquiring establishments), the sum of the individual components in the entering, exiting, and continuing segments can be greater than the segment percentages, when considering the number but not employment.

7 See Note 1 to Table 3-1 for the reason for excluding 26 of the 167 four-digit industries into which the manufacturing sector is divided by the 1970 SIC.

8 Subsequent work on employment loss and gain in declining and growing industries (with the same definitions as in Table 3-3) revealed similar results. For example, declining industries adjust employment to lower levels of output about half through reduced entry rates and about half through increased exit rates, compared with growing industries. See Economic Council of Canada (1988*c*, Table 3, p. 14).

9 The establishment is the smallest operating unit at which the Census of Manufactures can collect data. In a small number of cases, this may involve the aggregation of separate operating units commonly referred to as plants.

10 The level of aggregation may differ and, therefore, firm data may not be the same in different situations. For more discussion, see Appendix B.

11 When an industry is defined at a fine level of aggregation (i.e., the four-digit SIC level), some entry will be the result of a reclassification of establishments as the product line shifts. This is less of a problem for this chapter, since the industry is defined as all of manufacturing. For further discussion, see footnote 14.

12 Appendix B discusses the databases in more detail.

13 While similar, the two concepts are not identical. In Baldwin and Gorecki (1983), entry could occur when firms that were already in manufacturing entered a four-digit industry where they previously did not have an establishment. Some of this will not be firm entry to the manufacturing sector as defined here. See Appendix B for more details on the data used here.

14 An establishment may switch its output composition such that it moves from one industry to another within manufacturing. While such interindustry movement would have been captured in the Balwin and Gorecki (1983) study, such interindustry movement is not recorded when looking at the manufactruring sector as a whole. Some preliminary work was done on this topic. It indicated it was not of great importance, in any event. Using the methodology in Appendix B, all those establishments classified as continuing in 1970-71 *and* 1978-79 were selected. The industry to which the establishment was assigned in 1979 was then examined to determine whether it was different from that in 1970. It was found that 91.3 per cent of continuing establishments did not change their industry classification, while 8.6 per cent did.

15 A firm is classified as an exit in a particular year if it owned no establishment in that year but at least one in the previous year. The death of a firm is dated by either: (a) the last year in which all of the establishments owned by the firm completed an Annual Census of Manufactures questionnaire (in addition, the firm must not build a new establishment or acquire another establishment in that year); or (b) the last year in which any establishment that filed an Annual Census of Manufactures questionnaire has the given firm code attached to its file. In case (a), the firm has exited by the closure of all the establishments it owns; while in case (b), the firm has exited by selling off its assets. While it is possible for a firm to exit by both methods, this occurs infrequently. The same can be said about the simultaneous use of both methods of entry. See Appendix B. Entry is defined using the same approach. A firm is classified as an entrant in the first year that it owns any establishment that completes an Annual Census of Manufactures questionnaire. The establishment may either be a new establishment (entry by building a new establishment) or one that existed in the previous year (entry by acquisition).

16 The difference in the variances is significant at the 1 per cent level for rates measured in terms of numbers, and at the 7 per cent level for the rates in terms of employment.

17 The regression made allowance for the break in the series in 1975 because of the change in the division between long- and short-form establishments. See Appendix B for a discussion of this issue.

18 This discussion implicitly assumes that the firm and establishment population in the base year changes little over time in terms of employment. This need not be the case. For example, exits may come from the base-year population and not from recent entrants; and if recent entrants show positive growth rates, the longer-run annualized rate will again exceed the short-run yearly rate.

19 That the firm rates are higher than the establishment rates means the acquisition or divestiture process by entering and exiting firms affects more firms than the establishment birth and death process affects continuing firms.

20 If a firm goes bankrupt, is reorganized, and is run by a new set of owners, it is classified as an exit via divestiture in the database.

21 This is done by subtracting the new establishment of new firm entry rate from the corresponding entry rate for all

new establishments. A similar procedure was followed for exits. Due to some differences in the way these two sets of data were assembled, the comparison is not exact. See Appendix B for details.

CHAPTER 4

1 The longitudinal employer file is derived by Statistics Canada, from the Revenue Canada taxation data that each employer must file. For more details, see Statistics Canada (1988) and Appendix C. The advantage of this database is that it covers a wide set of industries in addition to manufacturing. For two studies using this database, see DRIE (1986*b*, 1986*c*).

2 The firm is defined by the Statistics Canada Business Register Master File. This is a centrally maintained list of business entities each of which is assigned a unique role, a Business Register Identification (BRID) number. (For further details, see Statistics Canada, 1988, p. 10, and Appendix C.) When only some establishments of a firm (less than an entire BRID unit) are divested or sold, this will be included as job loss under the continuing segment. If these establishments are assigned a new BRID number because they are combined into a new legal entity, births will also reflect this transaction. If these establishments are subsumed into an existing legal entity, then the merger will affect growth in the continuing segment. When an entire BRID unit is sold, this may be listed as an exit or it may have no effect on job-loss statistics. Whether it does so depends upon what happens to the BRID number assigned to the divested entity. The BRID number is assigned to a legal entity. If the legal entity remains the same, there will be no change in the BRID code and a merger will not affect the calculation of job growth or job loss. If the divested firm is subsumed into an existing entity, then job change will be allocated, on one hand, to an exit and, on the other, to growth in the continuing segment because of growth in jobs in the acquiring firm from the merger. If two firms merge and a new legal entity is formed at the BRID level of aggregation, this will be counted as two deaths and one birth. Only in the latter case will a merger affect both deaths and births. (For further discussion of how BRID codes may change, see Statistics Canada, 1988, p. 20.)

3 BRID numbers may also change when an unincorporated company becomes a corporation. Once more, this will overstate entry and exit rates. The fact that the LEAP file defines a business at a lower level than the census file does will also influence the number of exits and entrants and, to some extent, the rate of entry and exit calculated from the number of businesses. It should not bias the entry and exit rates calculated using employment. For more details, see Appendix C.

4 Statistics Canada plans in subsequent work to identify the merger-related components of the LEAP database.

5 In the census, an establishment employing 60 people for one-half of the year is counted as having 30 employees on average. In the LEAP file, the methodology used will essentially do the same (see Statistics Canada, 1988, p. 16, footnote 16).

6 It would appear that smaller firms typically have a lower wage rate than larger firms. In estimating entry and exit rates, firm payrolls are divided by an industry average. Thus, to the extent that entrants/exits are small firms, entry/exit in terms of employment will be understated using the LEAP file. Rates of change should not be affected to the same degree. For further discussion of this point, see Statistics Canada (1988, pp. 13 and 15).

7 It should be noted that when we move beyond manufacturing, the concept of an establishment is less well defined.

8 That the LEAP file generates continuing firm growth and decline rates similar to the continuing establishment rates can be explained by two factors. First, mergers that bring a new firm into an industry may not change BRID numbers very frequently. Another explanation is that horizontal mergers tend to be not very important.

9 This is also the case if the results for a longer period are examined. The implicit job-change rates for 1978-84 for the LEAP file and for 1976-81 for the two census files were also compared (but not reported here) and the establishment results were closer to those of the LEAP file than were the enterprise results.

10 This is not to understate the potential importance of the merger process in the long run. A merger may protect existing jobs and create new ones for a firm that was otherwise failing.

11 See Appendix B for details.

12 Another reason for omitting 1982-83 is that the transition from the earnings concept used in 1982 to that used in 1983 yields an abrupt transition, making the employment growth rates for 1982-83 subject to greater error than other years (see Statistics Canada, 1988, p. 14).

13 Some of this turbulence may be due to the change in the method used to calculate the average yearly compensation and the change in SIC classifications (see Appendix C). However, the majority is no doubt due to the recession.

14 See Mutti (1978) for a discussion of what would happen should imperfect markets result in price rigidity.

15 For example, the 1978-86 exit rate derived from comparing endpoints only depends on the subsequent time pattern of exits in the 1978 firm population. If the fringe model is correct, exits in 1979 may be high because the 1978 population contains recent entrants; but in subse-

quent years, the number of exits will be small because the recent arrivals as of 1978 will have been eliminated. If this is the case, the implicit annual rate derived over a longer period will be inversely related to the length of the period. On the other hand, when changes are calculated annually, if the fringe model is correct, these rates will always have recent entrants as part of the population being examined and will be higher than the implicit annual longer-term rates.

16 It should be noted that the rough equivalence of the short- and long-term rates does not extend to exit rates calculated in terms of numbers when all firms are used (see Table 4-2). It does for firms with five or more employees. There is, therefore, a group of firms, whose employment effects are small, that do follow the fringe model – entry followed by immediate exit. This is similar to Churchill's (1954*a*, 1954*b*, 1955, 1959*a*, 1959*b*) results for the United States.

17 For further discussion with respect to the LEAP file, see Statistics Canada (1988, pp. 15-6).

18 While less important, it is still potentially a problem. The manufacturing sector has the fastest rate of absorption. In services, for example, the blow-up factor is 7.0 for one-year study periods, and 2.8 for five years.

19 This is not quite true. Both Birch (1979) and the DRIE studies screen out change that is considered abnormal. Johnson and Storey (1985) point out that, since mergers probably result in new identification numbers, and some mergers will increase the size of a firm by a very large amount, the screen for hyperactive growth will exclude some mergers. In correspondence with the authors, officials at DRIE note that this screen removes only 2 per cent of the Canadian records. These records, however, may account for a large percentage of employment change.

20 The unpublished DRIE study, "Identification of births," was kindly made available to the authors by department officials. Note that the 35 per cent in that study refers to firms founded in October 1986 that were listed as births over the period 1974-82, but were not in fact births. As such, firms that could not be located were not included in the calculation. Reynolds' work is summarized in Reynolds, West, and Finch (1985).

21 One other peculiarity of the Dun and Bradstreet data should be noted. While each establishment record is linked to a firm, the sum of establishment employment that can be linked to a firm is generally less than the employment listed for the firm. This has led to an active debate between two groups (MIT and Brookings Institute researchers) who have attempted to calculate firm rather than establishment job turnover. Johnson and Storey (1985, pp. 16-9) summarize the debate. According to them, neither the use of the establishment sums nor the enterprise numbers is appropriate. Establishment totals will miss branches of multi-establishment firms. But firms entries for employment calculated by the Brookings Institute include worldwide employment, a point also made by MacDonald (1985, p. 178) in studying the food and beverage industry. More recent versions of the D&B tapes developed by the U.S. Small Business Administration (1988, pp. 16-8) have attempted to correct both problems.

22 Establishments in the Dun and Bradstreet file are assigned an SIC code on the basis of their reporting of sales in different industries.

23 This is the relevant comparison, because the Dun and Bradstreet deaths will include both establishment closures and divestitures. Note that Baldwin and Gorecki (1983) present data in terms of share of shipments, not employment. The latter numbers are presented in Table 3-1 of this study.

24 Because of the overstatement of entry and exit rates in the Dun and Bradstreet file, it appears that the D&B identifiers do change as a result of mergers. The continuing establishment sector, therefore, is underrepresented. Establishments affected by mergers are transferred to the entering and exiting segments, whereas they should be left in the continuing segment if they have not actually disappeared. That the Dun and Bradstreet rates of employment change for the population classified as continuing are about the same as the more complete sample derived in this study suggests that the rates of change in the merged group are either quite similar to the complete continuing sample, or that the omitted group is relatively small.

25 Conclusions about significant differences across sectors are not yet warranted given the present state of the LEAP file.

CHAPTER 5

1 For example, in the 1974-76 period, establishment birth rates are 9.5, 6.9, 6.2, and 4.5 per cent across the fast, moderate, slow, and declining classes, respectively; the corresponding establishment death rates are 5.7, 5.3, 6.1, and 5.4 per cent (Birch, 1979, Table 3-1, p. 22).

2 Armington and Odle (1982, p. 15) observe that 60 per cent of establishments in their Dun and Bradstreet sample report no change in employment between 1978 and 1980. This is high relative to other studies. The OECD (1987, Table 4-2, p. 102) study of job creation and destruction reports that more comprehensive databases for France and Germany show that between 1978 and 1984, on an annual basis, 47.7 and 40.0 per cent of establishments, respectively, show no change. For Japan, less than 40 per cent

show no change. The data reported in Chapter 3, based on the Census of Manufactures, indicate less than 20 per cent of Canadian establishments, accounting for less than 10 per cent of total employment, show no change when adjacent years between 1970 and 1981 are compared. Leonard (1987, Table 6.3, p. 146), in his study of Wisconsin, finds less than 10 per cent of employment is in establishments with no year-to-year employment change.

3 The Dun and Bradstreet data for Canada show an even greater importance of births than Birch's results presented in Table 5-2. For the period 1974-82, the Canadian annual implicit rate of employment change arising from births was 4.8 per cent; for expansion, 2.4 per cent (DRIE, 1985, Table III-4B, p. 17). These are not necessarily out of line with Birch's results for the United States: the Canadian source uses an eight-year period to compare the status of establishments, the U.S. source, two to four years. Chapter 3 shows that the importance of births relative to expansion increases as longer periods are used.

4 Two other studies using the Dun and Bradstreet file come to quite different conclusions about the importance of entrants relative to expansion in continuing firms – though not about the relative volatility of entrants and exits. Armington and Odle (1982, Table 1, p. 15) and the U.S. Small Business Administration (1984, p. 26) find establishment expansions to be more important than establishment openings, and establishment contractions more important than establishment closures. The former source, for 1978-80, found establishment births were responsible for a job gain of 7.7 per cent of base-year employment, expansions for 14.06 per cent; closures for an employment loss of 6.09 per cent; contractions for 7.03 per cent. The reason for the differences is that these two sources include all the worldwide operations of U.S. firms as a continuing group thus substantially increasing the importance of job loss and gain from this source. (Birch and McCracken, 1983; Johnson and Storey, 1985). For this reason, we have omitted further discussion of the various results coming from the Small Business Administration in Washington.

5 The standard error of the mean entry rate is 1.01; the exit rate, 0.56; the expansion rate, 0.84; and the contraction rate, 1.32.

6 For all sectors, the UI data for Wisconsin show an average annual loss rate of 8.9 per cent for the period 1978-80; while Birch's data (1979, Appendix A, p. A-50) for Wisconsin give an implicit average annual loss rate of 5.7 per cent for the period 1969-76. For manufacturing, the rates are 6.4 and 5.1 per cent, respectively. The UI data for Pennsylvania show an average gross job-loss rate of 11.3 per cent for the period 1976-79, while Birch (ibid., p. A-39) reports an implicit annual decline rate of 6.3 per cent for the period 1974-76. Some of the difference between the UI and D&B estimates for the same states is the result of the different time spans used. The UI data are calculated by comparing employment status one year apart; the D&B figures use three-year intervals. The results in Chapter 3 show the latter should produce lower implicit annual rates because of the lengthier period used for the analysis.

7 See Birch (1979, Appendix A, p. A-39). Birch refers to the periods 1969-72, 1972-74, and 1974-76. In all periods, job gain through births exceeded that caused by continuing establishment expansion (except for 1969-72), while jobs lost because of closures exceeded those lost due to continuing establishment contraction.

8 It was demonstrated for Canada that the magnitude of the error of including all mergers as part of entry could be quite large. For instance, adding merger entry to firm entry by establishment creation doubled the entry rate (Table 3-10). The studies, based on the D&B file, of establishment birth and expansion found that entry was about twice as important as expansion when measured over an eight-year period in the 1970s and early 1980s (Table 4-10), whereas in actual fact it was of about the same importance when mergers were removed (Table 3-9).

9 According to a study cited by Leonard (1987, p. 143).

10 They are similar in that both are based on a comprehensive source – official census data. Many of the concepts and definitions in the two censuses are also similar. For detailed information on measurement, see Dunne and Roberts (1986). The U.S. database uses only establishments with five or more employees. It should not include mergers as births since it is establishment-based. While the data after 1972 is maintained by the Industry Division of the Census Bureau, Dunne and Roberts had to do the pre-1972 matching themselves. Since births and deaths result when establishments cannot be matched in adjacent censuses, any errors will end up in these categories.

11 One important caveat is required here. The U.S. data do not come from an annual census as do the Canadian data. It is, therefore, somewhat more difficult to keep track of establishment status and ensure that identifiers do not change where ownership changes. The U.S. Census of Manufactures data may have a merger component that the Canadian data does not have.

12 Canada and Sweden estimated a full-year equivalent work force; West Germany omits part-time workers. In France, neither is done and thus employment figures include both full- and part-time workers. This may account for part of the difference between France and West Germany.

13 These VAT figures are taken from the annual data in *British Business* (September 19, 1986, pp. 6-7). On the entry side, the minimum and maximum rates were 11.0 and

13.3 per cent, respectively; on the exit side, 9.2 and 11.5 per cent, respectively. In 1981 there was some underreporting of both entrants and exits due to a civil service strike. The mean 1980-85 rates were estimated excluding this year: entry rates became 12.1 per cent; exit rates, 11.0 per cent.

14 Churchill (1954*a*, 1954*b*, 1955, 1959*a*, 1959*b*) and U.S. Bureau of the Census (1961, Table 634, p. 486, and 1963, Table 646, p. 488).

15 Reviews of U.K. job-generation studies may be found in a number of publications by Storey and Johnson (1986, 1987*c*, and 1987*d*, pp. 72-89).

16 Another study also used Scottish data (Beesley and Hamilton, 1984) to compare establishment entry and exit rates for a cross-section of 57 manufacturing industries. Between January 1, 1976, and March 30, 1980, the number of births equalled 17.9 per cent of the 1973 establishment stock. Exiting establishments for 1977-79 accounted for 19.3 per cent of the 1973 stock. The majority (76 per cent for births and 78 per cent for deaths) were independent entities – i.e., not subsidiaries, associates, branches, or franchises. The variance of the birth rates across industries was found to be greater than that of death rates. This is similar to the U.S. and Canadian findings.

17 Johnson (1986); Gould and Keeble (1984); Storey (1982); and O'Farrell and Crouchley (1984), which refers to Ireland.

18 Johnson's (1986, p. 94) conclusion is doubly problematic since he makes an arbitrary correction for the undercounting of new firms in the Dun and Bradstreet database used by Birch (1979). He multiplies the entry percentage by a factor of 3 to correct for the reporting lag in the D&B data. However, Birch and McCracken (1983, Table 7, p. 23) indicate that for a three-year period, the appropriate blow-up factor is only 1.8 for manufacturing.

19 Alternately, firm entry by establishment creation accounted for only 56 per cent of new firm employment in the 1970-79 comparison. Using this split would yield 11.6 per cent of 1981 employment in new firms that arose from new establishments.

20 It is also worth noting that the definition of firm entry used in the U.K. studies is quite narrow. Establishments created by existing firms, even if those firms are located in other industries, are generally not considered to be firm births. Yet, if we are looking at the extent to which new participants in an industry add to growth, they should be. It was this more inclusive definition that was used in the Baldwin and Gorecki (1983) study of entry and exit over the decade 1970-79. When the unconsolidated firm concept at the four-digit SIC level was used to define a firm, it was found that over 16.5 per cent of employment in 1979, on average, was accounted for by new firms creating new establishments and over 29 per cent by all new firms – compared to 7.7 and 21.0 per cent for the period 1971-81 when the firm was defined at the manufacturing level and employment was used to measure its importance.

21 For a discussion of the advantages and disadvantages of using the D&B data for the United Kingdom, see Storey and Johnson (1986) and Gallagher and Doyle (1986). We believe Gallagher and Doyle effectively address most of Storey and Johnson's criticisms.

22 Gallagher and Stewart (1986) observe that their U.K. data, admittedly covering a longer period than the Birch (1979) study, bear a close resemblance to the latter. The Birch data suggest that the implicit annual rate of employment change from new firm via establishment births was 1.9 per cent for 1969-76 – calculated across three-year periods – the same as Gallagher and Stewart derive over a 10-year period. They note that their use of a longer period classified a higher proportion of job gain as births, a point developed in Chapter 3. Thus the importance of job creation by new firm via new establishments is probably lower in the United Kingdom than in the United States – but how much lower is not clear. Moreover, the difficulty in using the D&B data to estimate firm entry and exit rates is such that little credence should be given to firm entry rates derived therefrom. See Johnson and Storey (1985).

CHAPTER 6

1 These rates are calculated from Appendix Tables D-1 and D-2. The economy-wide job/employment ratio uses employment data from the Labour Force Survey; the manufacturing ratio uses employment figures from the Census of Manufactures.

2 Layoffs are defined as "suspensions without pay lasting or expected to last more than seven consecutive calendar days, initiated by the employer without prejudice to the worker." Other separations include "terminations of employment because of discharge, permanent disability, death, retirement, transfers to another establishment of the company and entrance in the Armed Forces for more than 30 days" (Feldstein, 1975, pp. 734-35).

3 Lilien (1980) uses monthly data for individual industries and a distributed lag model to estimate the permanent-recall rate for layoffs. His estimates suggest a 68-per-cent return rate.

4 The survey reported in *Hirings and Separations Rates in Central Industries* (Cat. No. 72-006) was done semi-annually of all establishments covered by the Unemployment Insurance Act – essentially establishments with

10 or more employees and all establishments of multi-establishment firms with any insured employees. In contrast to the U.S. survey, it excluded employees who were out of work but who expected to return in 30 days.

5 While the Canadian monthly separation rate is about 1 percentage point higher than the U.S. rate for the same period, little should be drawn from this difference. The data from the Bureau of Labor Statistics have incomplete coverage of some states and undersample small firms and new firms. For further discussion, see Kaliski (1981).

6 This was kindly made available by Matthew Robertson of Employment and Immigration Canada in the form of an unpublished paper (Robertson, 1987*a*) – a shortened version of which was subsequently published (Robertson, 1987*b*) – together with some additional material. Subsequently, improved versions have been developed by the Business and Labour Market Analysis Group, Statistics Canada, under the aegis of Garnett Picot. We are indebted to him for allowing us access to these files so that we could update and modify Robertson's earlier work.

7 See Appendix D for details on the employer concept associated with the filing of separation data. For the work reported in this chapter, the employment concept corresponds to that used for the LEAP data reported in Chapter 4.

8 An employee is found to return to another employer by checking subsequent years for another ROE form (another separation) or the T4s tax forms an employer must file for employees at the end of a year. Two years were chosen as the period for search. For further discussion of this choice, see Robertson (1987*a*, p. 22).

9 The average permanent-layoff rate for the period 1978-83 is 8.1 per cent of those with jobs, 9.2 per cent if it is calculated as a percentage of the Labour Force Survey employment concept. This compares to the average job-loss rate of 9.7 per cent that the Statistics Canada LEAP file yields for the same period, but excluding the public sector (see Table 6-3, column 9).

10 For the cross-sectional exercises here and in the next section, the unmodified CEIC data were used. The modifications discussed in Appendix D that were applied to the earlier Robertson data only affected the level of separations estimated and not the cross-industry variants therein.

11 The Canadian separation data are calculated relative to the number of workers with a job; the U.S. rate is derived monthly and is calculated relative to the employees.

12 In Chapter 3 we followed the OECD (1987, p. 107) procedure of dividing the minimum value by the mean annual change to derive that portion of annual change that is structural in nature. The separation data yields a ratio of 76.9 per cent for the whole economy, 71.4 per cent for manufacturing, compared with the figure 70.2 per cent based on job loss in Chapter 3.

Chapter 7

1 See Economic Council of Canada (1988*b*) for a discussion and analysis of policy in several of these industries.

2 Canada, Department of Employment and Immigration (1985, Table 15, p. 36). The percentage of total separations that drew UI benefits for 1976, 1979, and 1982 was 51.5, 45.0, and 58.7, respectively. The rest of those who became separated did not draw UI benefits or remained continuously employed (but switched employers).

3 The sample concentrates on only a portion of separations. Nevertheless, the particular group chosen is one whose circumstances (at least two spells of unemployment) are of particular importance. These are the separations whose transition is more difficult than those who move to another job directly without having to avail themselves of UI benefits.

4 "Employer" is defined as a payroll number (see Appendices C and D). To the extent some firms have more than one payroll number, these data may overstate employer mobility. However, multiple payroll numbers may be the result of a firm having operations in different industries, and in this case the employee may truly have switched to another industry.

5 The four-digit occupational code contains nearly 500 categories. See Canada, Department of Manpower and Immigration (1971, p. xi), and the discussion in Chapter 2 of this study.

6 Survey evidence reported in the next section and in Appendix E corroborate the picture drawn here using administrative data files.

7 While the Labour Force Survey examines the mobility of laid-off workers, it should be stressed that the determination of the cause for separating is ascertained not by the employer, as is the case with the Record of Employment data, but by the worker's response to the survey question.

8 Only 21,093 of the 33,292 exits were in the T4s records in 1983 and thus were deemed to be employed. For the same year, 2,568 were found to be on unemployment insurance and 9,631 were not found (presumably retired or had become self-employed). This is about 10 per cent of base-year employment (Allen, 1985, p. E-10).

9 This work was based on 10-per-cent samples for SIC industries 172 (leather tanneries) and 174 (shoe factories). Each individual was classified as employed, unemployed, claiming UI benefits, or out of the labour force for each

week. For the 3,089 individuals in the Ontario sample, there were 42,274 T4s records, 17,057 Records of Employment, and 8,569 UI claims. For the 2,817 individuals in the Quebec sample, there were 37,046 T4s records, 15,169 Records of Employment, and 9,043 UI claims (Alam, 1985, Appendix A, p. 2).

10 The distribution of exits in Table 7-8 considers *all* subsequent jobs; the data on previous jobs, just the origin of the worker prior to his working in the footwear sector (based on discussions with the author).

11 This study used a 10-per-cent sample drawn from the CEIC administrative data files of Canadians who worked (at least one week) in the automotive industry (SIC 323 and 325) between January 1972 and January 1983.

12 For the criteria defining exits and entry, see note 1 to Table 7-9.

13 The shipbuilding study examined a cohort of workers employed in this industry (SIC 327). See note to Table 7-10. Exit is defined as a nonreturn to the shipbuilding sector. The distribution of exits, in contrast to the footwear study, is based only on the first job after a permanent separation.

14 The electrical/electronics sector is defined as the 1970 SIC 318, 331, 332, 333, 334, 335, 336, 338, and 339. It is based on a 10-per-cent sample taken from the CEIC labour force database of workers who between January 1977 and January 1983 had at least one spell of employment (one week) and then left the industry. The distribution is based on only the first job, instead of all subsequent jobs as was the case for footwear.

15 It should be noted that the differences in the relative rankings of some cities using the layoff data as opposed to the unemployment data are considerable.

16 A new job is one in which the duration of employment is less than six months at the time of the survey.

17 Data supplied by Labour Market Studies Division, Department of Employment and Immigration. Like Table 7-18, it refers to individuals who had no employment two years after layoff. This criterion excludes 4.6 per cent of men and 9.3 per cent of women.

18 Data supplied by Labour Market Studies Division, Department of Employment and Immigration.

19 Implications about the fate of older workers drawn from this table should be made with caution. A higher proportion of the older age class would be expected to have a shorter tenure because more are closer to retirement.

20 The wage concept here is insurable earnings as reported by the employer on the ROE form and subsequent earnings as reported on the next ROE form filed for that worker. The results, therefore, will be influenced by different tenure histories. It should be noted that insurable earnings under the unemployment insurance scheme have a ceiling. However, it is common practice to have the actual earnings filled in even when they exceed the limit. Nevertheless, some truncation will occur, and to the extent earnings increase with age, this truncation will mean a lower percentage of older workers would be found to experience an increase in wages in their next job.

21 Picot and Wannell (1987) report that in the sample of workers displaced between 1981 and 1984, 55 per cent of those who found a new job earned more, though the mean increase was negative. In addition, they report that the percentage who did better is lower for the older age groups.

CHAPTER 8

1 In view of the low coverage of the primary sector in the LEAP file, it is not considered in the sectoral breakdown presented in this chapter. See Table 4-9 for details.

2 The 40-per-cent figure refers to all sectors of the economy, excluding public administration. It is derived by comparing the endpoints 1978 and 1986. The actual figure is 41.8 per cent. On an annual basis, of course, entry and exit became much less important, as Table 4-5 demonstrates.

3 For job loss, employment was derived from the average labour-unit concept used in the LEAP file as described in Chapter 4. For layoffs, employment in the firm was taken from the monthly tax returns filed by employers and is an annual average of monthly employment. The firm in the LEAP file is an aggregation of PAYDAC units to a BRID number (see Appendix C). The firm used for calculation of the distribution of separation data is the PAYDAC reporting unit and is less consolidated (aggregated) than the first.

4 However, the ratio of exits to gross job loss for the largest size group, when public administration is excluded, rises only marginally to 0.15.

CHAPTER 9

1 Births in this analysis include both newly opened establishments and those switched from another industry. Deaths include establishment closures and establishments switched to another industry.

2 $Ln\,(SH/1 - SH)$ was the dependent variable. Zero values of the dependent variable were removed.

3 We also used ordinary least squares with and without the exclusion of zero values of the dependent variables. The results were qualitatively the same as those in Table 9-8.

4 Based on unpublished tabulations using the data described in Chapter 3 and Appendix B.

5 When we use the untransformed dependent variable, there is no significant difference, except for the intercept, between the coefficient values in the *SH*23 and *SH*34 equations.

Appendix B

1 As such, it excludes head offices and similar activities. For further details, see Statistics Canada (1979, pp. 11-5).

2 An establishment may undertake a number of different activities. To be classified to the manufacturing sector, the preponderance of these activities (based on the value added) must be in manufacturing. The manufacturing sector is defined as Division 5 of the 1970 Standard Industrial Classification. For details, see Dominion Bureau of Statistics (1970, pp. 23-43).

3 There are a number of differing reporting units under the Census of Manufactures, including head offices. Attention is paid here only to establishments. For further details, see Statistics Canada (1979, p. 10).

4 In some instances, several establishments may file a combined record in which cases the original statistics are prorated across the individual establishments, each of which has a separate RSN.

5 Statistics Canada (1979; 1983); and "A summary of the establishment description tape file," Statistics Canada, unpublished internal working document, Ottawa, Appendix C-1, p. 2.

6 This is often the case for databases used for U.S. studies that are generated from unemployment insurance or the Dun and Bradstreet records. For a discussion of the problems with these databases, see Chapters 4 and 5.

7 See Johnson and Storey (1985) for a criticism of the Dun and Bradstreet database and the discussion in Chapter 4.

8 The data for small plants that are taken from taxation administrative records in place of a mailed short-form questionnaire and the short-form records are both referred to here, for convenience, as "short-form."

9 To cite an earlier study on exit/entry conducted using Census of Manufactures data that also excluded short forms, see McVey (1981, p. 71).

10 For a discussion of the total activity concept used in the Census of Manufactures, see Statistics Canada (1979, pp. 21-2).

11 The data in this paragraph are taken from Statistics Canada (1979, pp. 43-4); (1986, pp. xii and xv).

12 The amount of follow-up by Statistics Canada that determines whether an establishment should be classified to the long-form category also varies over time. This will have less of an effect on this measure as long as an establishment that becomes large enough to receive a long form is eventually caught. The quality of the administrative data sources used and Statistics Canada's own reputation for diligence makes it likely such establishments will be caught.

13 Although the cutoff point subsequently drifts upwards, the increase in the percentage of short-form establishments by 1983 is relatively minor – only about 4 percentage points. In light of the relatively small correction required for entry rates at the 1975 revision, which increased short-form establishments by 14 percentage points, the corrections were taken no further.

14 Alternate assumptions about the distribution of omitted entrants were found to have little impact on the mean of the annual birth and death rates for the decade. See Baldwin and Gorecki (1988).

15 In 1980, the value added of enterprises classified to manufacturing was $66,472 million; to mining, $9,062 million; and to logging, $702 million (Statistics Canada, 1983*a*, Text Table VII, p. 15).

16 The value added is used to classify the enterprise to a four-digit SIC on the basis of the largest unconsolidated enterprise owned by the consolidated enterprise. For details of these two enterprise concepts, see Statistics Canada (1983*a*, pp. 28-30).

17 Using this definition, there were 30,160 manufacturing enterprises in 1980 (Statistics Canada, 1983a, Text Table VII, p. 15); however, if a manufacturing enterprise is defined as consisting of establishments with some activity in the manufacturing sector, then there would be 30,197 enterprises classified to the manufacturing sector (ibid., Text Table XIII, p. 21). Hence there were 37 enterprises classified to mining or logging with activities in manufacturing. For example, a mining firm could own a small smelter. Hence, in terms of numbers, it makes little difference how we define the universe of manufacturing firms.

18 No corresponding problem arises for establishment entry or exit. An establishment that exits the manufacturing sector – it fails to file an annual Census of Manufactures questionnaire – is assumed to exist no longer. In the parlance of the section, it has exited by closure. Similarly, establishment entry can only occur by building a new plant.

19 An alternative to matching whether an establishment filed an annual Census of Manufactures questionnaire in years t and $t + 1$ to determine whether the enterprise exited by plant closure is to refer directly to question 1.3.2 of the

questionnaire, which asks: "Did this establishment go out of business during the reporting year?" The answer had to be "yes" or "no" (Statistics Canada, 1979, p. 79). However, some preliminary work conducted within the Business Microdata Integration and Analysis group of Statistics Canada suggested that matching the establishment between years *t* and *t* + 1 was more reliable than accepting the answer to question 1.3.2.

Appendix C

1 The assignment of an SIC code to a BRID number is done in several ways. Large companies are sent a nature of business return. Individual sectors of Statistics Canada that use the BRID system for surveys then check and make improvements on the assignment.

2 A Comparison of Manufacturing Firm and Employment Statistics for 1978

	Number of firms	Employment[1]
Census of Manufactures	26,865	1,790,618
Results from Chapter 3	15,841	1,677,947
LEAP file	41,064	2,067,300

[1] Employment in the census refers to all wage earners and salaried employees. In the LEAP file, it refers to average labour units across all firms irrespective of their size.

Source Tables B-1 and C-4; Statistics Canada (1983*a*, Table 1, p. 2); and special tabulations provided by Statistics Canada.

3 It was assumed, for both entrants and exits, that these firms operated on average for only half the year. Therefore, employment figures were doubled to give yearly estimates.

4 Primary combines divisions 1 (agriculture), 2 (forestry), and 3 (fishing and trapping), while division 8 (trade) is broken down into wholesale and retail trade. For details of the 1970 SIC, see Dominion Bureau of Statistics (1970).

5 For the purposes of Tables C-1 to C-10, the LEAP file classifies a firm to a sector as of the latest year for which information is available, and then the firm remains classified to that sector for all of the years for which data is generated.

Appendix D

1 An employer will issue a record of earnings paid to an employee during a given calendar year which is sent to Revenue Canada. By matching the data on the Statement of Remuneration Paid (T4s) and the ROE, it is possible to see whether an employee has returned to the same employer.

2 This means that a shift of an employee from one payroll account of an employer to another account will be counted as a separation. For some purposes, this might not be desirable.

3 Essentially, this source provided the data used in the research report of the Economic Council of Canada (1988*b*, Chapter 3, pp. 21-35).

4 The authors are indebted to Matthew Robertson of Strategic Policy and Planning, Employment and Immigration Canada, who patiently answered our questions concerning the derivation and meaning of the data used and numbers produced. We are equally indebted to Garnett Picot for his making available the version which he developed. Access to the latter allowed us to check and double-check the validity of the separation rate. The version of the file from the Business and Labour Market Analysis Group used herein was the 0.2-per-cent sample of the main file.

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